122

DENON

Hi-Fi Component

SERVICE MANUAL
MODEL DRM-510
STEREO CASSETTE TAPE DECK

SPECIFICATIONS

Type	Vertical tape loading; 4-track 2-channel stereo cassette deck
Heads	Recording/playback head Erase head (Double-gap ferrite)
Motors	Capstan (DC servo motor) ×1 Reel (DC motor) ×1
Tape Speed	4.8 cm/sec.
Fast Forward, Rewind Time	Approx. 110 sec. with a C-60 cassette
Recording Bias	Approx. 105 kHz
Overall S/N Ratio (at 3% THD level)	Dolby C NR on: more than 74 dB (CCIR/ARM)
Overall Frequency Response	25 ~ 18,000 Hz ±3 dB (at −20 dB, Metal tape)
Channel Separation	More than 40 dB (at 1 kHz)
Wow & Flutter	0.055% WRMS, ±0.14% w. peak
Input	
LINE	80 mV (−20 dBm) input level at maximum Input impedance: 50 kohm unbalanced
Output	
LINE	775 mV (0 dB) output level at maximum (with 47 kohm load, recorded level of 200 pwb/mm)
PHONES	1.5 mW output level at maximum (optimum load impedance 8 ohm ~1.2 kohm)
Accessories	Parallel pin cord ×2
Power Supply	50 Hz/60 Hz, voltage is shown on rating label
Power Consumption	17 W
Dimensions	434 (W) × 124 (H) × 275 (D) mm
Weight	7.0 kg

* Above specifications and design are subject to change without prior notice.

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IMPORTANT TO SAFETY

WARNING :

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Please, record and retain the Model name and serial number of your set shown on the rating label.
Model No. DRM-510 Serial No.

IMPORTANT
(BRITISH MODEL ONLY)

The wires in this mains lead are coloured in accordance with the following code :

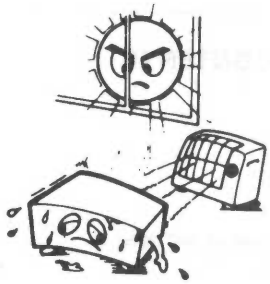
Blue : Neutral
Brown : Live

The colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows.
The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

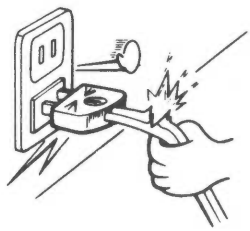
FOR YOUR SAFETY
(AUSTRALIAN MODEL ONLY)

To ensure safe operacion, the three-pin plug supplied must be connected only with a standard three-pin power point which is effectively earthed through the normal household wiring.
Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.
The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, contact a qualified electrician.

NOTE ON USE/HINWEISE ZUM GEBRAUCH/OBSERVATIONS RELATIVES A L'UTILISATION

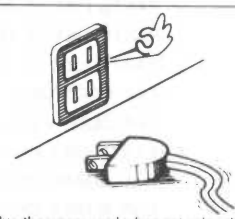


- Avoid high temperatures
  Allow for sufficient heat dispersion when installed on a rack.
- Vermeiden Sie hohe Temperaturen
  Sehen Sie zu, daß eine zureichende Luftzirkulation gewährleistet wird, wenn das Gerät auf ein Regal gestellt wird.
- Eviter des températures élevées
  Tenir compte d'une dispersion de chaleur suffisante lors de l'installation sur une étagère.

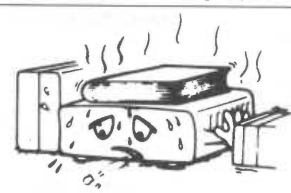


- Handle the power cord carefully.
  Hold the plug when unplugging the cord.
- Gehen Sie vorsichtig mit dem Netzkabel um.
  Halten Sie das Kabel am Stecker, wenn Sie den Stecker herausziehen.
- Manipuler le cordon d'alimentation avec précaution.
  Tenir la prise lors du débranchement du cordon.

- Keep the set free from moisture, water, and dust.
- Halten Sie das Gerät fern von Feuchtigkeit, Wasser und Staub.
- Protéger l'appareil contre l'humidité, l'eau et la poussière.



- Unplug the power cord when not using the set for long periods of time.
- Wenn das Gerät eine längere Zeit nicht verwendet werden soll, trennen Sie das Netzkabel vom Netzstecker.
- Débrancher le cordon d'alimentation lorsque l'appareil n'est pas utilisé pendant de longues périodes.



*(For sets with ventilation holes)

- Do not obstruct the ventilation holes.
- Die Belüftungsöffnungen dürfen nicht verdeckt werden.
- Ne pas obstruer les trous d'aération.

- Do not let foreign objects in the set.
- Keine fremden Gegenstände in das Gerät kommen lassen.
- Ne pas laisser des objets étrangers dans l'appareil.

- Do not let insecticides, benzene, and thinner come in contact with the set.
- Lassen Sie das Gerät nicht mit Insektiziden, Benzin oder Verdünnungsmitteln in Berührung kommen.
- Ne pas mettre en contact des insecticides, du benzène et un diluant avec l'appareil.

- Never disassemble or modify the set in any way.
- Versuchen Sie niemals das Gerät auseinander zu nehmen oder auf jegliche Art zu verändern.
- Ne jamais démonter ou modifier l'appareil d'une manière ou d'une autre.

Thank you very much for purchasing the DENON component DRM-510.

THE DENON DRM-510 is a top-line stereo cassette tape deck, capable of outstanding performance in combination with high grade hi-fi systems.

DENON proudly presents this advanced tape deck to audiophiles and music lovers as a further proof of DENON's non-compromising pursuit of the ultimate in sound quality. The high quality performance and easy operation are certain to provide you with many hours of outstanding listening pleasure.

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Please check to make sure the following items are included with the main unit in the carton:

(1) Operating Instructions 1
(2) Connection Cords 2
(3) Mini-plug Cable 1

FEATURES

- Computer controlled mechanism
- Non-slip reel drive for stabilizing tape tension
- Dual power supply
- High Performance R/P head
- Dolby HX PRO System
- Dolby B & C noise reduction system
- Manual bias adjustment control
- Mechanical tape counter with 3-digit readout and memory stop.
- Music search system
- REC return system

CONNECTION

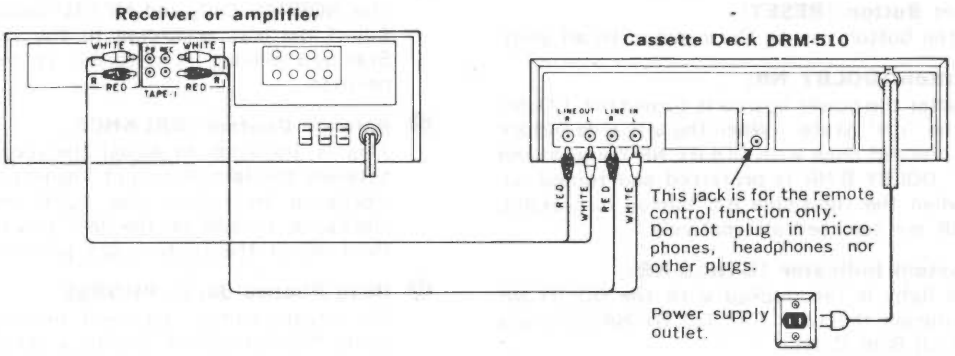
● Leave your entire system (including this cassette deck) turned off until all connections between the deck and other components have been made.

■ Connecting the deck to an amplifier

- Before connecting the deck to your amplifier, it is a good practice to review your amplifier's instruction manual.
- Use the white plugs for the left channel, and the red plugs for the right channel.

■ Tape dubbing

- Many stereo amplifiers and receivers have tape dubbing circuitry so that tape duplication can be performed between two or more tape decks. Review your amplifier's instruction manual for a full explanation of this mode of operation.



■ Systems remote control

If you connect the remote control jacks of this cassette deck and a DENON's separately available receiver model (DRA series receiver for IS) which has the remote control provision with a mini-plug cable, each of "PLAY, FF, REW, STOP, REC/REC MUTE and REC PAUSE" functions can be remote controlled with the wireless handset of the receiver.

- Use the attached mini-plug cable.

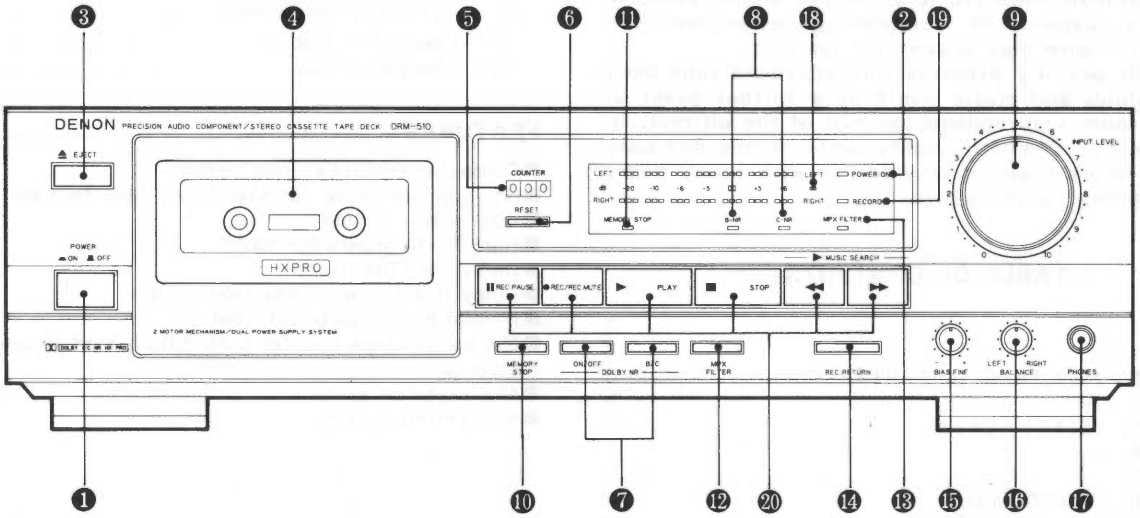
■ Connecting Headphones

To listen through headphones, plug your headphones into the PHONES jack.

■ Installation Precautions

If the deck is placed on or too near an amplifier or tuner, noise (induced hum) or beat interference may result (especially during AM or FM reception). If this occurs, separate the deck from other components or reorient its position.

NAMES AND FUNCTIONS OF PARTS



❶ Power Switch (POWER)
Controls the supply of AC power to the deck. One push turns the deck on, a second push turns it off. The deck remains in a stand-by (non-operative) mode for approximately 4 seconds after it is switched on.

❷ Power Indicator (POWER ON)
This indicator lights when the power switch is turned on.

❸ Eject Button (EJECT)
Press this button to eject the cassette. When the deck is operating (tape is running), press the stop (■) button first to stop the tape transport; then press the EJECT button.

❹ Cassette Compartment Cover
If this compartment cover is not closed completely, the deck's transport controls will remain inoperative.

❺ Tape Counter (COUNTER)
A 3-digit readout indicates the present tape count position.

❻ Counter Reset Button (RESET)
Operation of the button resets the counter to all zero.

❼ Dolby NR Button (DOLBY NR)
Immediately after the power source is turned off, DOLBY NR becomes the "off" state. When the left-side DOLBY NR button is pressed once with DOLBY NR being at the "off" state. DOLBY B-NR is preferred and turned on. Every time when the right-side B/C button is pressed, B-NR and C-NR are selected alternatively.

❽ Dolby NR System Indicator (B-NR/C-NR)
This indicator light is interlocked with the DOLBY NR button and informs the user that DOLBY NR is in use as well as which B or C type.

❾ Input Level Control (INPUT LEVEL)
The recording input level is adjusted by this knob. The levels in the left and right channels can be changed simultaneously.

❿ Memory Stop Button (MEMORY STOP)
The tape can stop at the point of any counter value where this button is pressed, irrespective of the counter value "000".

⓫ Memory Indicator (MEMORY STOP)
This indicator light is interlocked with the memory stop button.

⓬ MPX Filter Button (MPX FILTER)
The MPX FILTER button should be used to prevent interference with the Dolby NR circuit when making Dolby NR encoded recordings of FM stereo programs. When making Dolby NR encoded recordings from any program source other than FM stereo, leave this button in the "OFF" position.

⓭ MPX Filter Indicator (MPX FILTER)
This indicator light is interlocked with the MPX FILTER button.

⓮ REC Return Button (REC RETURN)
When this button is pressed at the recording state, the tape is rewound to the starting point. When the starting point is automatically reached, the record standby mode (rec pause state) comes.

⓯ Bias Fine Control (BIAS FINE)
(for NORMAL CrO_2 and METAL tape)
Adjust the bias according to the tape characteristics. Standard biasing is obtained at the center click-stop position.

⓰ Balance Control (BALANCE)
This is the knob to adjust the recording level balance between the left and right channels. Turn it counter-clockwise to reduce the right channel's level and clockwise to reduce the left channel's. Usually, put the knob at the center click position.

⓱ Head Phones Jack (PHONES)
For private music enjoyment without disturbing others, or for monitoring a recording, a set of headphones may be plugged in. Impedance should be from 8 to 1200 ohms.

⓲ Peak Meters
These meters indicate recording or playback peak levels for each channel.

⓳ Record Indicator (RECORD)
When the REC/REC MUTE button is pressed, this indicator will light up.

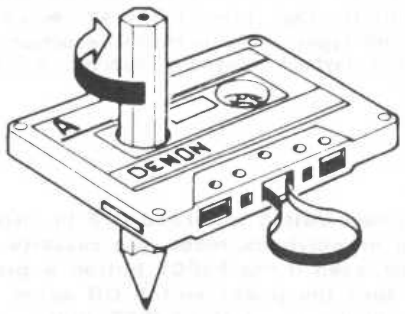
⑳ Tape Transport Controls

▶ PLAY	Play Button	Press to playback tape.
■ STOP	Stop Button	Press to stop tape in any mode.
◀◀	Fast Rewind Button	Press for fast rewind.
▶▶	Fast Forward Button	Press for fast forward tape winding.
● REC/REC MUTE	Record/Mute Button	To begin recording, press the REC/REC MUTE and PLAY buttons simultaneously. If only the REC/REC MUTE button is pressed, the deck is placed in the REC PAUSE (record standby) mode. When this button is pressed under the REC PAUSE state, the mode shifts to the Auto Rec Mute. When this button is pressed for making a non-recorded part between two melodies, about 5 sec of non-recorded part can automatically be created.
❚❚ REC PAUSE	REC Pause Button	Press this button if you want to change from the rec mute or recording state into the rec pause state. "REC PAUSE" is effective during "RECORDING" only.

CASSETTE TAPE

■ Handling Precautions

- C120 cassettes
  C120 cassettes are not recommended as they use a very thin tape base which may become tangled around the capstan or pinchroller.
- Tape slack
  Before putting a tape into the deck, take up any slack with a pencil or your finger tip. This precaution is also to prevent the tape from becoming entangled around the capstan or pinchroller.

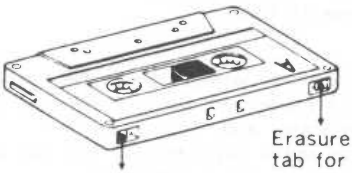


■ Storage Precautions

- Do not store cassette tapes in a place where they will be subject to :
  - Extremely high temperature or excessive moisture
  - Excessive dust
  - Direct sunlight
  - Magnetic fields (near TV set or speakers)
- To eliminate tape slack, store your cassettes in cassette cases with hub stops.

■ Accidental Erasure Prevention

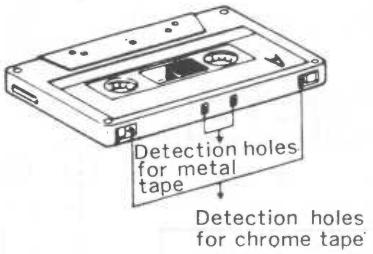
- Every cassette has erasure prevention tabs for each side. To protect your valuable recorded tapes from accidental or inadvertent erasure, remove the tab for the appropriate side with a screwdriver or other tools.
- To record on a tape with the erasure prevention tabs removed, cover the tab holes with plastic tape.



AUTO TAPE SELECT FEATURE

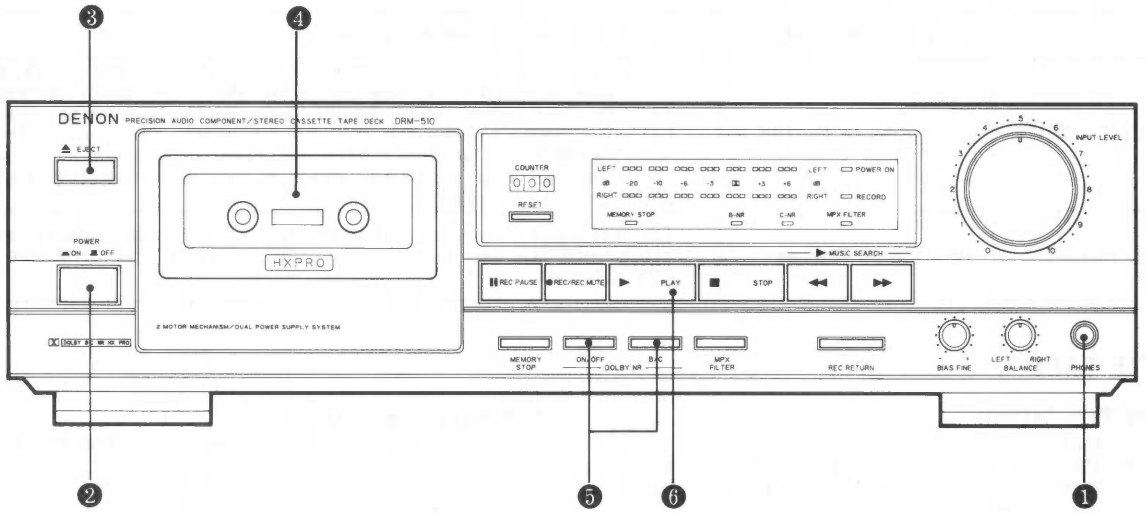
This Stereo Cassette Deck contains an Auto Tape Select feature which automatically selects the optimum bias and equalization for the tape in use. This is accomplished by detection of tape type detection holes in the cassette housing.

- If a tape without tape type detection holes is used, the deck will automatically adjust itself for normal tapes.



PLAYBACK

- Switch on your amplifier or receiver.
- Set the TAPE MONITOR switch on your amplifier or receiver to the TAPE position
- Operate the deck in numerical order as illustrated below :



❶ PHONES
Playback sound is fed into the headphones set.

❷ POWER
Push the switch to turn "ON" (▬) the power.

❸ EJECT
Press the EJECT button to open the cassette compartment.

❹ Cassette Compartment Cover
Load the cassette tape.

❺ DOLBY NR
For recordings made without Dolby NR, set to "OFF".
For recordings made with Dolby B NR, set to "B".
(The B-NR indicator will light up.)
For recordings made with Dolby C NR, set to "C".
(The C-NR indicator will light up.)

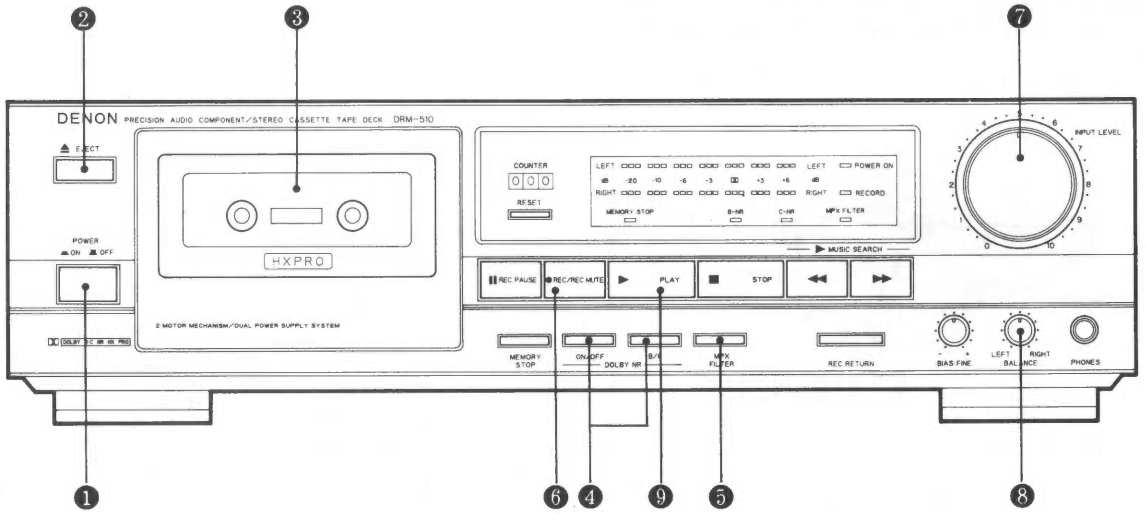
❻ ▶PLAY
Push the PLAY button

- When playback is finished, press the stop (■STOP) button.
- To restart the tape, press the PLAY (▶PLAY) button.
- If different types of Dolby Noise Reduction are used for record and playback, playback response will be adversely effected.

Note :
If the power switch is turned OFF in either the recording or playback mode, the cassette cannot be removed, even if the EJECT button is pressed. Please turn the power switch ON again, and then in stop mode, press the EJECT button to remove the cassette tape.

RECORDING

- Switch on the source component (tuner, amplifier, etc.).
- Set the TAPE MONITOR switch on your amplifier or receiver to the SOURCE position.



❶ **POWER**
Push the switch to turn "ON" (▬) the power.

❷ **EJECT**
Press the EJECT button to open the cassette compartment.

❸ **Cassette Compartment Cover**
(Make sure the erasure prevention tab has not been removed from the cassette shell half.)

❹ **DOLBY NR**
Set, in accordance with the recording to be made. For recordings without Dolby NR, set to "OFF". For recordings with Dolby B NR, set to "B" (The B-NR indicator will light up). For recordings with Dolby C NR, set to "C" (The C-NR indicator will light up). Future mistakes during playback can be avoided if the cassette is so marked for Dolby NR encoded recordings.

❺ **MPX FILTER**
Button it "ON" for the Dolby NR recording of FM broadcasts (The MPX FILTER indicator will light up).

❻ **●REC/REC MUTE**
When pressed, the deck goes into the record standby mode. The RECORD indicators will light, and both recording/playback and erase heads will come into contact will the tape. Initial setting of recording levels should be made in the record standby mode.

❼ **INPUT LEVEL**
Used to set the recording level.

❽ **BALANCE**
Adjust the recording level balance between the left and right channels.

❾ **▶PLAY**
When pressed, the recording will start.
(The RECORD indicators will light up).

- When recording is finished, press the STOP (■STOP) button.

Caution :
Be careful not to erase important recordings by mistake. Mis-erasing can be avoided by following the two steps below :

1. If the PLAY (▶PLAY) button is pressed while the RECORD indicator is on, the tape will be recorded.
2. If the PLAY (▶PLAY) and RECORD (●REC/REC MUTE) button are pressed at the same time, the tape will be recorded.

PROPER RECORDING LEVEL

A too high recording level can saturate the tape and cause distortion. On the other hand, if recording levels are set too low, soft passages will be marked by residual noise. Proper recording level is the single most important factor for making well balanced recordings.

Guideline for maximum recording level

TYPE Ⅰ (Normal) tape	0 dB levels on peaks
TYPE Ⅱ (CrO_2) tape	+3 dB levels on peaks
TYPE Ⅳ (Metal) tape	+3 dB levels on peaks

Note : Optimum recording levels can differ depending on program sources or the type of tape used.

■ Meter reading difference between L and R channels

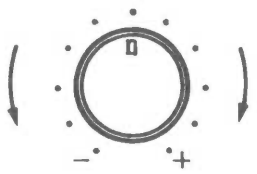
The left and right channels readings of the PEAK METER can differ due to variations in input signal levels. In such cases, adjust the individual channels of the BALANCE control until identical meter readings are obtained for both channels.

RECORDING BIAS ADJUSTMENT

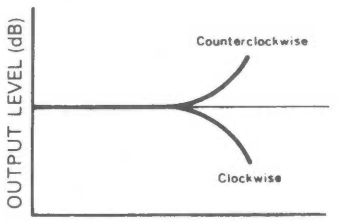
For best recording results, monitoring during the recording process and comparing various recordings using your own judgement are essential.

The DRM-510 is equipped with a bias adjustment control to assist you in setting the proper bias for different types and brands of recording tape. At the center-stop position, the deck is set for a reference bias level for NORMAL, CrO_2 and METAL tapes. If the resulting recording in this position has too much or too little high frequency content, varying the bias adjustment control can be useful to achieve betterresults.

If the high frequencies (treble sounds) are to be boosted, turn the bias control counterclockwise to decreases bias current. If distortion is of more concern than high frequency response, turn the control clockwise to increase bias current, By the use of this control, you can record tapes with response that matches your personnal listening tastes.



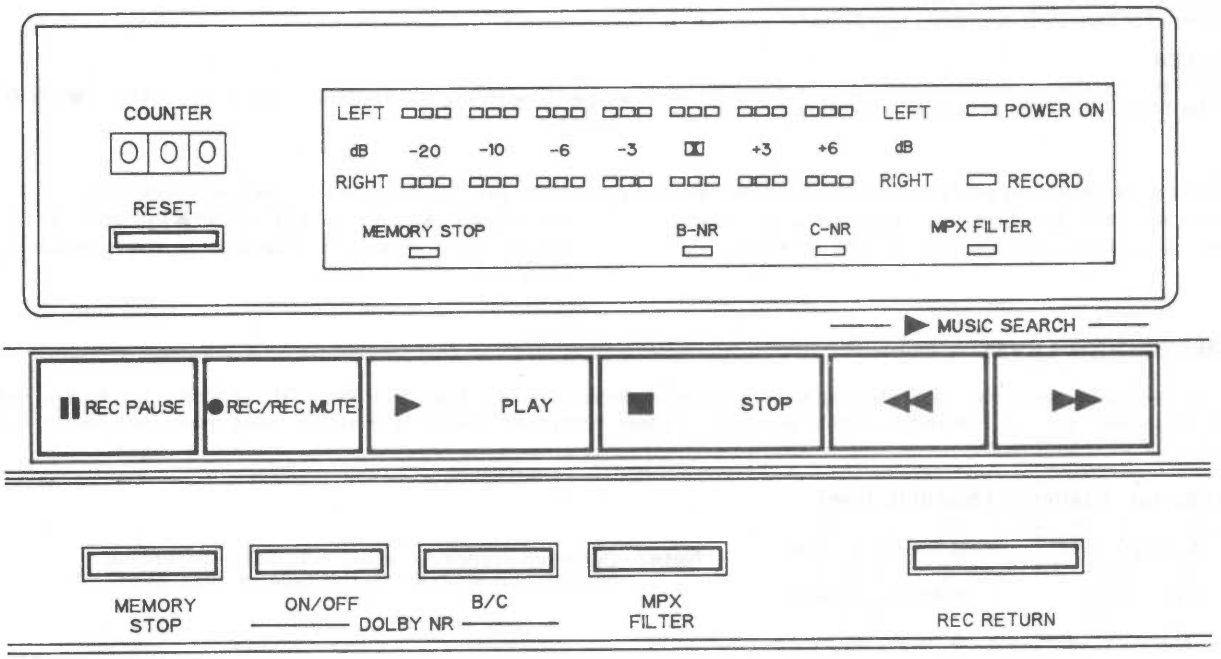
BIAS FINE



REC/REC MUTE AND REC PAUSE BUTTON

1. To record a 5-second blank section during recording:
   Press the REC/REC MUTE (●) button. A 5-second blank will be recordèd and the deck will enter the recording standby mode.
2. To record a 5-second blank section during the recording standby mode:
   Press the REC/REC MUTE (●) button from the recording standby mode. A 5 second blank will be recorded and the deck will enter the recording standby mode again.
3. To cancel recording of blank space:
   Press the REC PAUSE (❚❚) button. Blank space recording will be cancelled and the deck enters the recording standby mode.
4. Te extend the blank section with another 5 seconds or more:
   Simply press the REC/REC MUTE (●) button and the blank section will be increased with another 5 seconds.

TAPE COUNTER AND MEMORY STOP



1) Operation of the Tape Counter

(1) Press the RESET button to reset the Tape Counter to "000".

(2) The tape transport during all modes is indicated index position.

- During recording or playback, the counter indication is useful for noting the location of existing selections or the position from where recording is to start.

2) MEMORY STOP Operation

(1) During recording or playback, the Memory Stop feature can be used to locate a particular point on the tape. Press the MEMORY STOP button at the desired point.

(2) The MEMORY STOP indicator lights.

(3) The deck will stop at the desired point during Rewind operations.

- When the power is turned "OFF", this function is automatically deactivated.

MUSIC SEARCH SYSTEM

The music search system detects blank sections (lasting for at least 4 seconds) between selections in order to locate the beginning of selections in the forward or reverse direction.

1. To advance from the current selection to the beginning of the next selection (CUE):
   Press the PLAY (▶) button simultaneously with the Fast Forward (▶▶) button.
   The deck will skip the rest of the current selection and automatically resume play from the beginning of the next selection.
2. To repeat playback from the beginning of the current selection (REVIEW):
   Press the PLAY (▶) button simultaneously with the Rewind (◀◀) button.
   The deck will rewind the tape to the beginning of the current selection and automatically resume play from that point.
   This it very convenient for repeating playback of the current selection.

Notes on Music Search Operation:

The search functions operates by detecting comparatively long, blank sections approximately 4 to 5 seconds long, in between recorded selections. Therefore, the system may not operate normally in the following cases:

- Recordings with discontinuous speech or conversation.
- Recordings with long periods of pianissimo (softly played music).
- Recordings with long silences.
- Blank sections with a high level of noise.
- Blank sections shorter than 4 seconds.
- If noise-emitting appliances, such as electric razors, drills, refrigirators, etc., are operated nearby.

DOLBY B AND C NOISE REDUCTION SYSTEM

- The Dolby noise reduction system substantially reduces the tape background noise (hiss) inherent in the cassette medium. Dolby B NR is most widely in use. However, Dolby C NR is a much more recent development and represents a significant improvements over Dolby B NR.
- Tape background noise consists primarily of high frequency information, which is particularly annoying during soft passages. The Dolby NR system increase the level of low volume mid- and high-frequency signals during recording and reduces the level of these signals by an identical amount during playback. As a result, the playback signal is identical to the original source, but the level of background noise generated by the tape is greatly reduced.
- The operating principle of Dolby C NR is similar to that of Dolby B NR except for the encoding/decoding response curves. The noise reduction effect obtained with Dolby C NR is up to 20dB, compared to 10dB with Dolby B NR. In addition, Dolby C NR uses an anti-saturation network and spectral skewing circuitry, for a significant improvement in the dynamic range of the mid- to high-frequencies.

DOLBY HX-PRO HEADROOM EXTENSION SYSTEM

This deck is equipped with the DOLBY HX-PRO headroom extension system. Since the system functions automatically during recording, no switching operation or adjustment is required. The system is effective with any type of Normal, CrO_2 and Metal tape.

The Dolby HX-PRO headroom extension system functions during recording to raise the saturation level in the treble range. Therefore, most of the treble range components distorted or lost during recording on conventional cassette decks are more faithfully recorded on the new DRM-510 cassette deck.

Features of the Dolby HX-Pro Headroom Extension System

(1) Performance of Normal and CrO_2 tapes can be improved to very close of that offered by Metal tape.
(2) The dynamic in the treble range are improved significantly.
(3) Since no decoding is necessary during playback, the improved sound can be enjoyed on any type of tape deck, including portable players and car audio systems.
(4) The system functions whether the Dolby B/C NR system is engaged or not.

MAINTENANCE

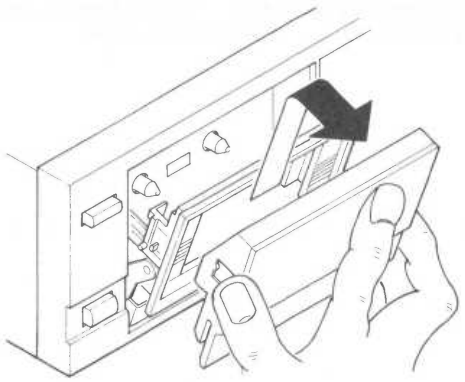
■ Removing the cassette compartment cover

It will be more convenient if the cassette compartment cover is removed during the cleaning of the pinchroller and heads, or during demagnetizing of heads.

Follow these procedures :

1. Press the EJECT button to open the cassette compartment.
2. Hold only the cover of the cassette compartment and pull it up. The compartment cover is removed from the front.

When attaching the cassette compartment cover, reverse the above procedure.

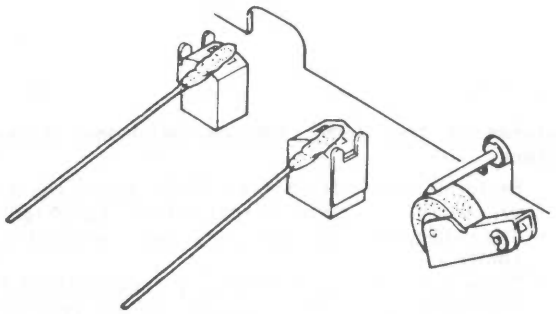


■ Head Cleaning

After long usage, tape coating or dust may adhere to the heads causing deterioration of sound. Clean them regularly. Use a cotton swab moistened with cleaning solution (such as alcohol).

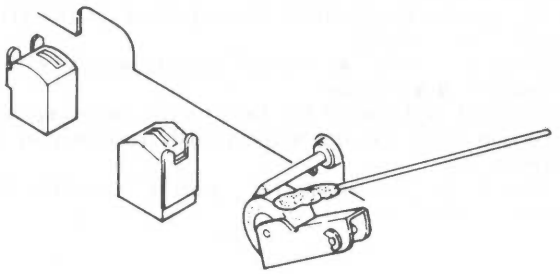
Note :

1. Some cleaning cassettes on the market have a strong abrasive effect and scratch the heads. Use cotton swabs instead of cleaning cassettes.
2. Since the use of metal tapes is apt to collect more dust on the heads, clean the heads more often to enjoy optimum sound.



■ Cleaning the pinchroller and the capstan

If the pinchroller or the capstan accumulate dust, tape transport may become unstable resulting from slippage during recording or playback. The tape can also be damaged by being rolled up around the capstan.
Clean them with a cotton swab or a soft cloth moistened with cleaning solution (such as alcohol).



■ Demagnetizing the heads

The heads may become magnetized after long usage or by having a strongly magnetized object brought near them. The result is a generation of noise, loss of the high frequency range, or erasing the treble components of pre-recorded tapes and adding noise.
Demagnetize the heads on a regular basis.

■ Procedure

1. Be sure to turn "off" the power supply.
2. Turn the demagnetizer "on" while it is more than 30cm away from the heads. Bring the demagnetizer near the heads and slowly move it in a small circle four or five times.
3. Slowly move the demagnetizer away from the heads and turn "off" the power of the demagnetizer when it is about 30cm away from the heads.

TROUBLESHOOTING

Make sure of the followings before you consider as any malfunctions:

1. **Are all the connections correct?**
2. **Is the set being operated correctly in accordance with the operating instructions?**
3. **Are the speakers and amplifiers functioning correctly?**

If the tape deck still does not function properly, check it again, using the check list below. If the symptom does not correspond to the check list, please contact your DENON dealer.

Symptom	Cause	Remedy
Tape does not run.	Power cord is off. Tape is completely wound up. Tape is loose. Cassette is not loaded properly. Defective cassette.	Check power cord. Rewind tape. Tighten tape with pencil, etc. Load cassette properly. Replace cassette.
Tape is not recorded when recording button is pressed.	No cassette is loaded. Erase prevention tab is broken off.	Load cassette. Cover hole with plastic tape.
Sound is warbled or distorted.	Heads, capstan or pinchroller are contaminated. Tape is wound too tight. Recording input level is too high. Tape is worn out and has "drop-outs".	Clean them. Fast forward or rewind to loosen tape winding. Adjust recording input level. Replace tape.
Excessive noise.	Tape is worn. Heads, capstan or pinchroller are contaminated. Heads are magnetized. Recording input level is too low.	Replace tape. Clean them. Demagnetize heads. Adjust recording input level.
High frequency (treble) is emphasized.	Dolby NR button is set improperly.	Set Dolby NR button properly.
High frequency (treble) is lost.	Heads are contaminated. Tape is worn.	Clean them. Replace tape.
When a CrO_2 or metal tape is placed in the deck, a different tape indicator comes on.	The cassette housing is of an older design without tape type detection holes.	Use the latest cassette with tape type detection holes.
The cassette tape cannot be removed.	If the power switch is turned off in either the recording or playback mode, and the unit is stopped, there may be case when the cassette cannot be removed, even if the EJECT button is pressed.	Turn the power switch ON again, and then press the stop (■) button. Then, in the stop mode, press the EJECT button to remove the cassette tape.

SPECIFICATIONS

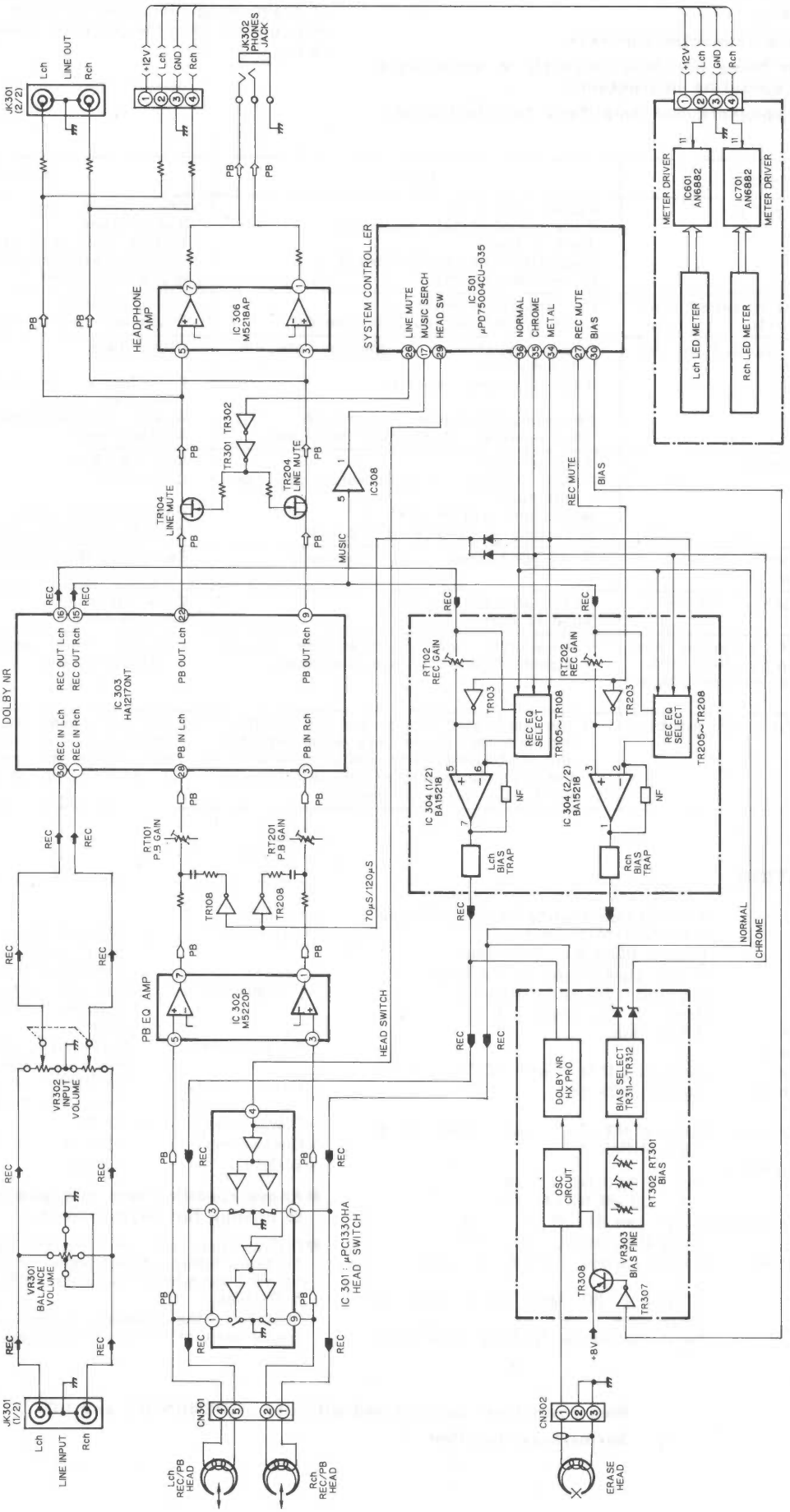
- Type .....Vertical tape loading 4-track 2-channel stereo cassette deck
- Heads.....Record/ Playback (R/P head)
  Erase (Double gap ferrite head)
- Motors.....Capstan (DC servo motor) × 1
  Reel (DC motor) × 1
- Tape Speed.....4.8 cm/sec.
- Fast forward, rewind time.....Approx. 110 sec. with a C-60 cassette
- Recording bias.....Approx. 105 kHz
- Overall S/N ratio (at 3% THD level)..Dolby C NR on ... more than 74 dB (CCIR/ARM)
- Overall frequency response.....25~18,000 Hz ±3 dB (at −20 dB METAL tape)
- Channel separation.more than 40 dB (at 1 kHz)
- Crosstalk .....more than 65 dB (at 1 kHz)
- Wow & flutter.....0.055% wrms, ±0.14% w. peak
- Inputs
  line.....80 mV (−20 dBm) input level at maximum
  Input impedance : 50 kohm unbalanced
- Outputs
  line.....775 mV (0 dB) output level at maximum (with 47 kohm load, recorded level of 200 pwb/mm)
  headhone .....1.2 mW output level at maximum (optimum load impedance 8 ohm~1.2 kohm)
- Accessories.....Parallel pin cord × 2
  Mini-plug cable × 1
- Power supply .....50 Hz/60 Hz compatible, voltage is shown on rating label
- Power consumption.17 W
- Dimensions .....434 (W) × 124 (H) × 275 (D) mm
- Weight.....3.8 kg

■ **Above specifications and design styling are subject to change for improvement.**

■ Dolby noise reduction and HX Pro headroom extension systems manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.
"DOLBY", the double-D symbol DD and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

Best results will be obtained with use of DENON DX and HD Series cassette tapes.

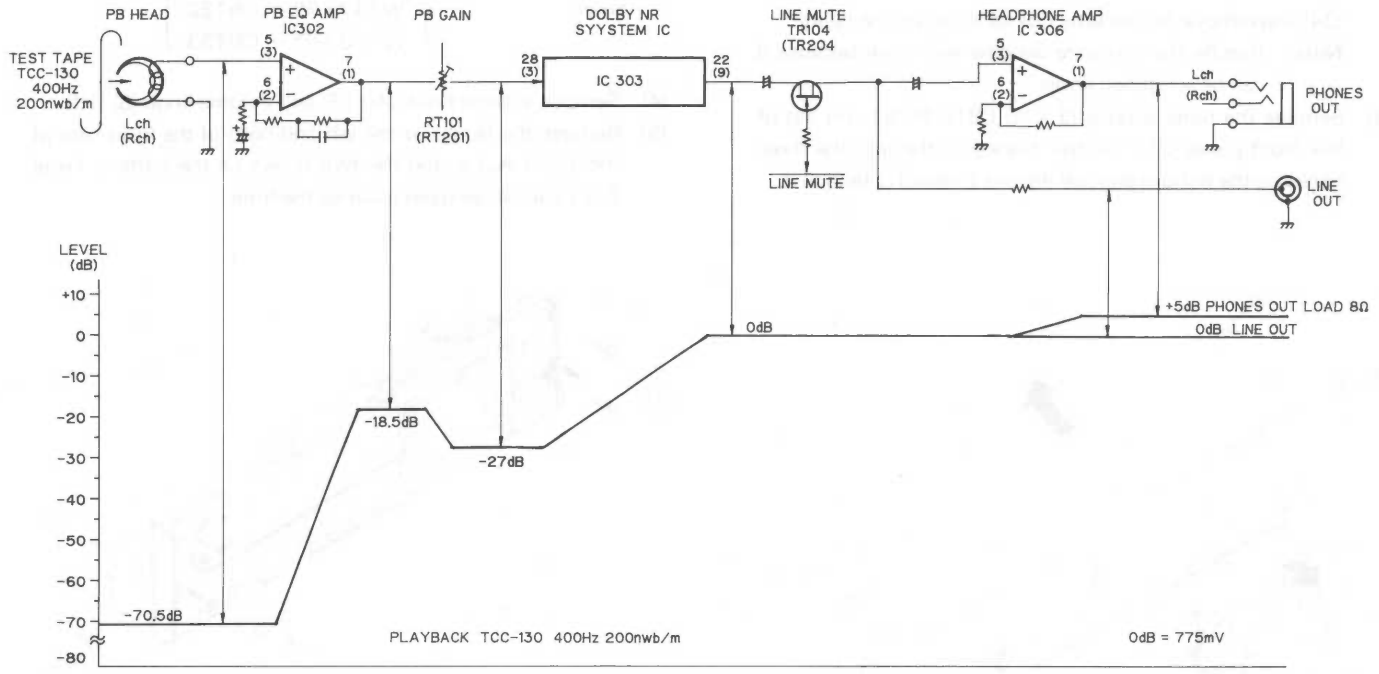
BLOCK DIAGRAM



LEVEL DIAGRAM

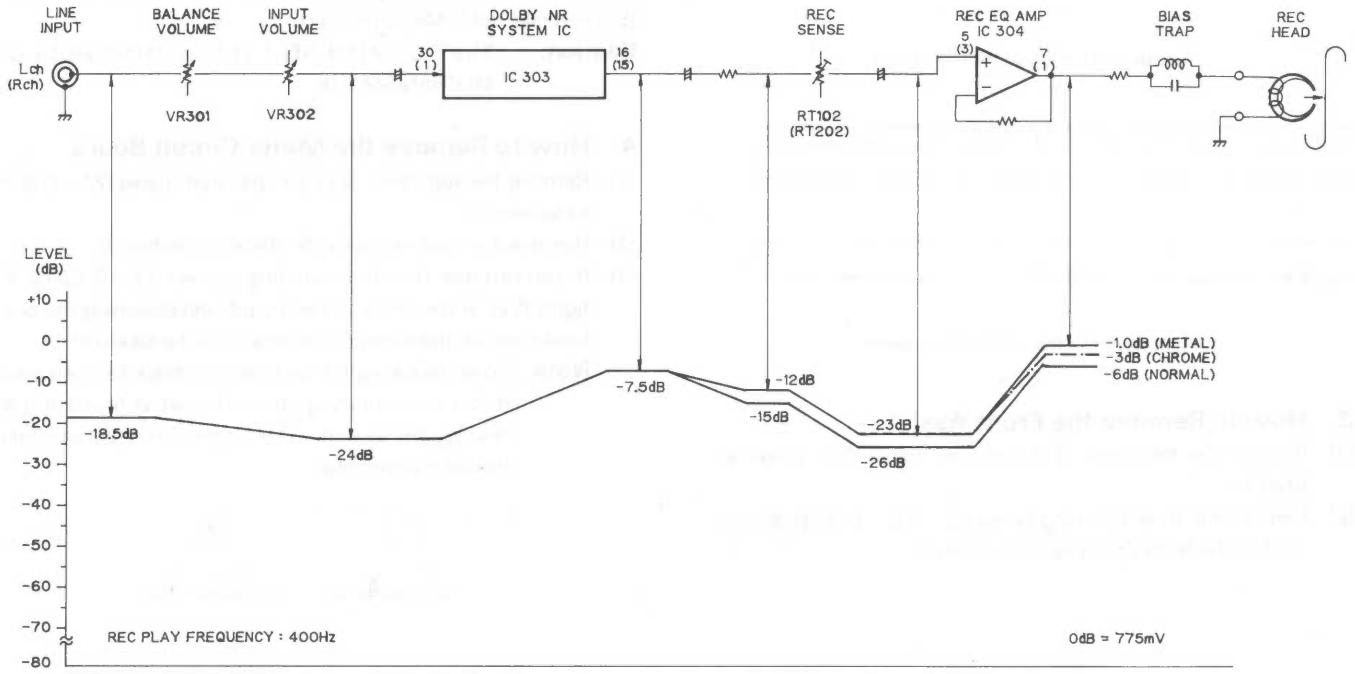
PLAYBACK SYSTEM

TCC-130 DOLBY B-TYPE
400 Hz 200 nwb/m



RECORDING SYSTEM

INPUT FREQUENCY
400 Hz



DISASSEMBLY INSTRUCTIONS

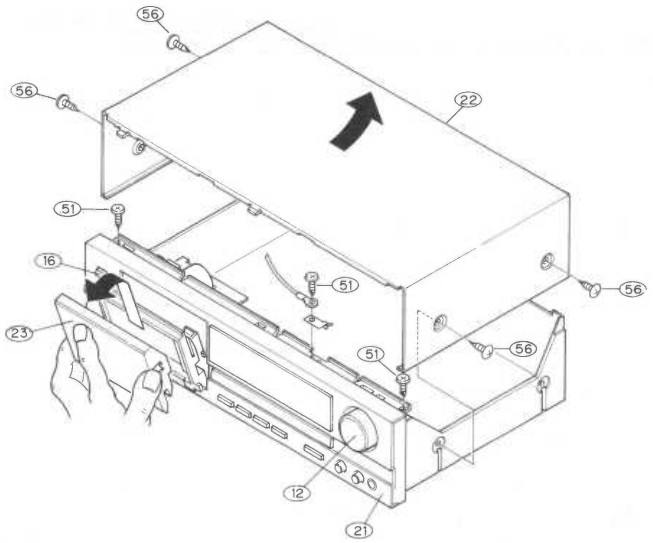
1. How to Remove the Front Panel

(1) Remove the four screws (4 ×10 CTTS-P) (56) in the side of the top cover (22). Move the top cover to the rear and rise it to remove it.

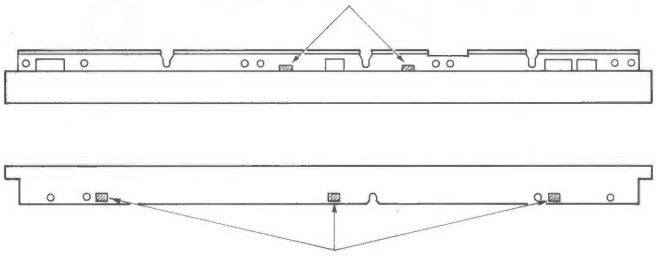
(2) Press the eject knob (16), open the cassette window (23) (24) and remove the cassette box as shown in the figure.

Note: Handle the cassette window with care because it can be scratched easily.

(3) Remove the three screws (3 ×10 CBTS-P) (51) on top of the front panel (21), the two hooks on the top, the three hooks on the bottom and pull the unit forward to detach it.



2 hooks on the top of the front panel



3 hooks on the bottom of the front panel

2. How to Remove the Front Ass'y

(1) Remove the top cover (22) and front panel (21). (Refer to Step 1.)

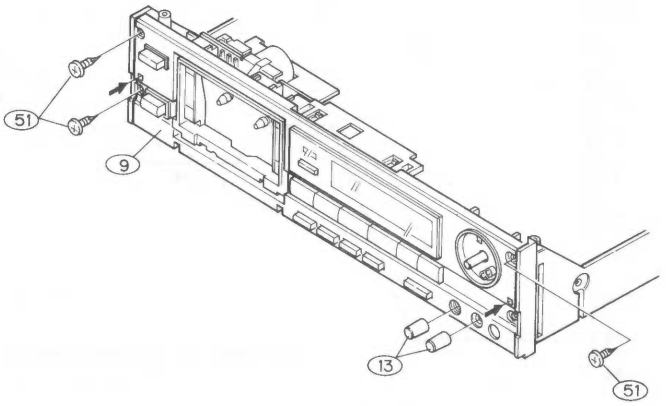
(2) Remove the three retaining screws 3 ×10 CBTS-(P)-B (51) holding the Front Escutcheon at the front.

(3) Disconnect all lead connectors.

C Mechanism	W153 (3P)	Audio circuit board
	W151 (5P)	
	W152 (5P)	
	Head wire → CN301	
	Head wire → CN302	
Meter circuit board	W131 (4P) → CN131	
	W132 (7P) → CN132	
	W133 (7P) → CN133	

(4) Remove Volume Knob (A) (12) and Volume Knob (B) (13).

(5) Remove the Hooks at the left and right of the front face of the Front Ass'y, and the two hooks on the bottom, Front Ass'y can be removed towards the front.



Hooks at left and right of Front Ass'y

3. How to Remove the Mechanisms

Remove the four Mechanism retaining screws 3 ×10 CBTS(P)-B (51) and take out C Mechanism (7).

Caution: The COUNTER BELT (19) is attached to C. MECHANISM (10).

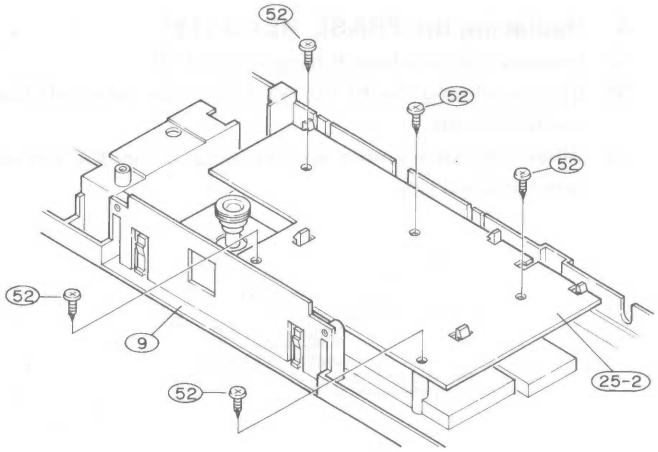
4. How to Remove the Meter Circuit Board

(1) Remove the top cover (22) and the front panel (21). (Refer to section 1).

(2) Remove the front esc ass'y (9). (Refer to section 3).

(3) If you remove the three binding screws (3 ×8 CBTS·P tight) (52) of the meter circuit board, and loosening the two hooks (large), the meter circuit board can be taken off.

Note: When replacing the tact switch, check to make sure that it is not floating above the circuit board. If it is floating, the switch will be in the on condition when the set is assembled.

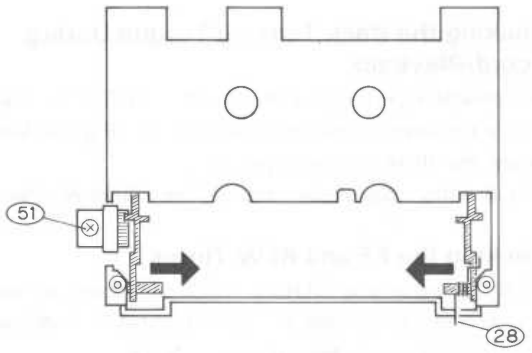


Meter Circuit Board

5. How to Remove the Cassette Door

(1) Remove the MINI DAMPER retaining screw 3 ×10 CBTS(P)-B (51) and take out the MINI DAMPER (38).

(2) Hold the legs of the CASSETTE BOX folded inwards and pull up to remove the CASSETTE BOX (8) and BOX SPRING. (28).



Front surface of Front Ass'y

6. How to Remove the Audio Circuit Board

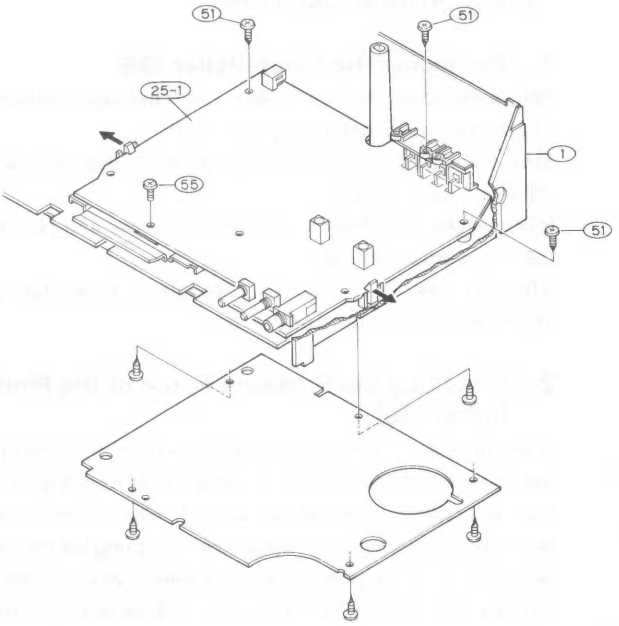
(1) Remove the top cover (22) and the front panel (21). (Refer to section 1.)

(2) Remove the front ass'y. (Refer to section 2.)

(3) Remove the connectors with lead wires which run from the audio circuit board and the connectors on top of the audio circuit board.

Side of the Power supply circuit board	W191 — (5P) → CN191	Side of the audio circuit board

(4) Remove the screw (3 ×10 CBTS ·P tight) (51) (3 ×6 CBTS ·S tight) (54) that is holding down the 4P pin jack (31) and circuit board (25-1). By removing the two catches (left and right) of the chassis holding down the circuit board in the directions of the arrows shown below, the audio circuit board can be pulled forward.



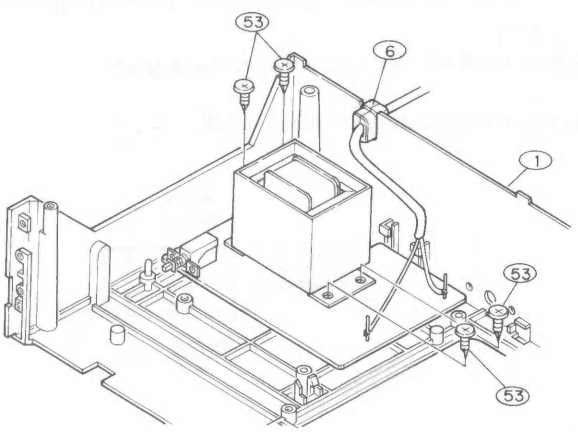
Note:
- Almost all of the service repairs to the audio circuit board can be performed by removing the bottom cover on the rear side of the chassis. Only when it is unavoidable should you refer to the removal method mentioned above.
- When reassembling, follow the procedures in the reverse order. However, if each of the various parts are not assembled properly in their respective position, the set cannot be assembled in some cases. Therefore, check the work of each step carefully when assembling.

7. How to Remove the Power Supply Circuit Board

(1) Remove the top cover (22) and the front panel (21). (Refer to section 1).

(2) Remove the bushing (6) that is fixing the power supply cord from the chassis (1).

(3) When the four screws (4 ×10 CBTS ·P tight) (53) that are holding the power transformer and circuit board are removed, the power supply circuit board can be removed by raising it.



ADJUSTING AND CHECKING THE MECHANISM SECTION

1. Replacing the Pinch Roller (36)

Before replacing the pinch roller, clean the tape contact surface of the pinch roller and the capstan shaft.

Most causes of poor tape transport can be traced to dirty pinch roller and capstan shaft.

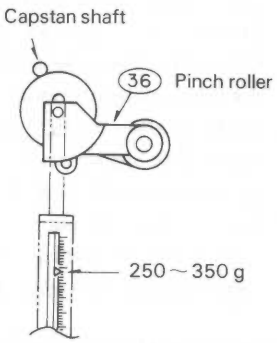
Remove the clips that press the pinch roller and pull the pinch roller forward to remove it.

After replacing, run a padless C-90 tape to check for tape curls at the tape guide section of the head.

2. Checking the Pressure Force of the Pinch Roller (36).

In the playback mode, hook a spring weight onto the bracket at the center of the pinch roller. After separating the pinch roller from the capstan shaft, allow the pinch roller to contact the capstan shaft again. Check to make sure the spring weight reads between 250 ~ 350 g when the pinch roller starts to rotate.

Replace the pinch roller (36) when it does not conform to the standard specification values.



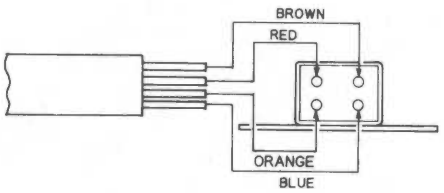
3. Replacing the Record/Playback Head (14)

(1) How to remove the R/P HEAD.
   1) Remove securing screw (1) and azimuth adjusting screw (1) from the record/playback head.
   2) Remove the soldered head wire and disassemble the mechanical unit to remove the record/playback head.

(2) How to assemble the R/P HEAD.
   Reverse the above 1 procedures for removing the R/P HEAD.

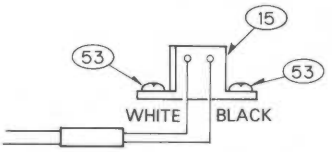
* Solder the HEAD WIRE according to the diagram.

mechanism (recording/playback head)



4. Replacing the ERASE HEAD (15)

(1) Unscrew the erase head holding screws (53).
(2) By unsoldering the HEAD WIRES can be taken off the mechanism unit.
(3) When the replacement is completed, secure the screws with the screw lock.



5. Checking the Take-up Torque

Load the cassette type torque meter (SONY TW2111).

Check to make sure that the average torque meter reading is within 30-70 g-cm during playback. If it is not within this range, check the voltage (approx. 4V) of the reel motor. If the voltage is low, the torque will be weak: if it is high, the torque will be strong.

6. Checking the FF and REW Torques

Load the cassette type torque meter (SONY TW2231). Check to make sure the torque meter indicates within 90 ~ 180 g-cm at the end of FF and REW.

7. Checking the Back Tension Torque During Record/Playback

Load the cassette type torque meter (SONY TW2111); check to make sure the torque meter reads between 2 ~ 6 g-cm during playback and that there is no unevenness.

If it is not within this range, replace the reel ass'y (5) or Washer.

8. Checking the FF and REW Times

Load a C-60 cassette tape (DENON HD7E/60); check to make sure the tape is fast forwarded or rewound within 110 seconds.

If it is not within this range, check sections 5 and 6.

9. Checking the Existence of a Cassette Housing and the Operation of the Erase Prevention, Metal and Chrome Switch

Confirm that the sensor arm properly detecting the tape type detection holes on the cassette housing.

ADJUSTING AND CHECKING THE ELECTRICAL SECTION

• Caution on adjusting

(1) Before adjusting, clean the head surface, capstan and the pinch roller with a gauze or a cotton swab moistened with alcohol.
(2) Demagnetize the R/P HEAD and the E. HEAD with a head eraser.
(3) Completely demagnetize the adjustment screwdriver.
(4) Unless instructed otherwise, set the various controls as follows.
- ○ INPUT volume ..... maximum
- ○ DOLBY NR switch ..... OFF
- ○ BIAS FINE volume ..... Center click position
- ○ BALANCE volume ..... Center click position

1. Tape Transport Check

Load the transport check cassette. In the operational mode, illuminate the fixing guides of the R/P HEAD with a lamp and check to make sure the tape edge does not come in contact with the tape guide section.
The tape transport is the most important element in determining the performance of a cassette deck.
Avoid moving the various adjustment screws, nuts, etc., as much as possible. Refer to the pages on "Adjusting and Checking the Mechanism Section" when replacing or adjusting the R/P HEAD.

2. Adjusting the Azimuth

(1) After completing the tape transport check, load the test tape (A-BEX TCC-153). **Fig. 2-1**
(2) Playback the test tape; adjust the azimuth screw so that section A of the resurge wave form is maximum and section B is minimum. **Fig. 2-2**

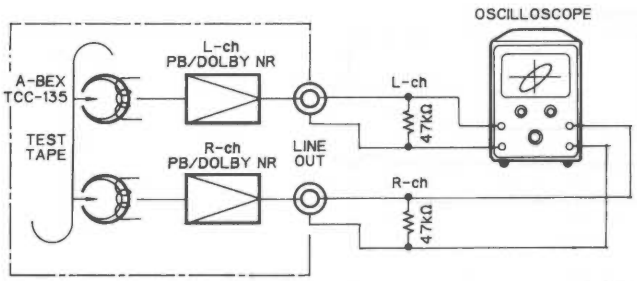


Fig. 2-1

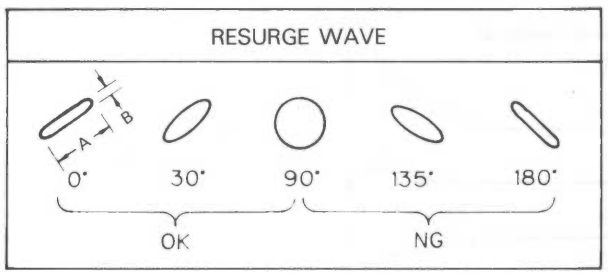


Fig. 2-2

EQUIPMENT FOR ADJUSTING AND CHECKING

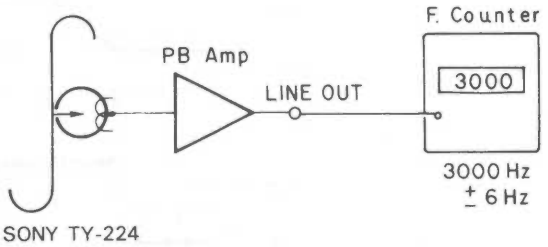
1) MEASURING TAPE ..... TYPE NAME, BRAND AND USES

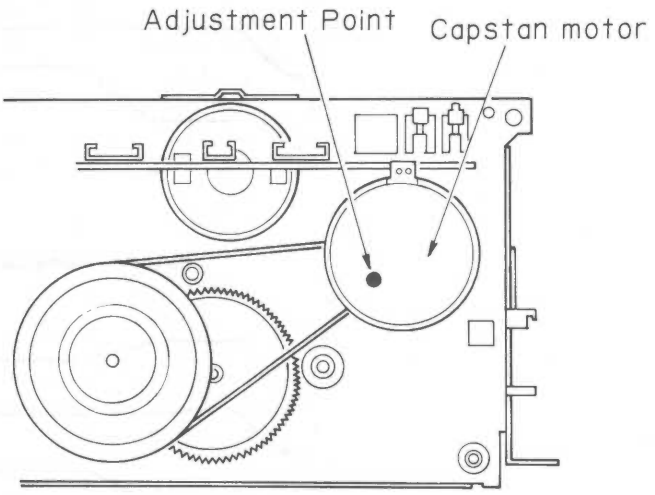
TYPE NAME	BRAND	USES
TW-2111A/2121A	SONY	Checking the Take-up Torque and Back Tension.
TY-2231	SONY	Checking the FF and REW Torque.
HD-7E/60	DENON	Checking the FF and REW Times.
TCC-153	A-BEX	Adjusting the Azimuth.
TY-224	SONY	Checking and Adjusting the Tape Speed.
TCC-130	A-BEX	Adjusting the Playback Level.
TCC-162/262B	A-BEX	Checking the Playback Frequency Response.
TCC-902	A-BEX	Transport checking cassette tape.

2) MEASURING INSTRUMENT
Tension gauge
Audio signal generator
Variable resistance attenuator
Electronic voltmeter
Oscilloscope
Frequency counter
Adjustment screwdriver
Trap coil adjustment square stick

3. Checking and Adjusting the Tape Speed

(1) Connect the frequency counter to the LINE OUT terminal and load test tape (SONY TY-224).
(2) Playback a test tape. At about halfway through the tape, where the tape transport is stable, adjust the adjustment points on the back of the capstan motor so that the frequency counter will have a reading within the range of 3,000 Hz ±6 Hz.

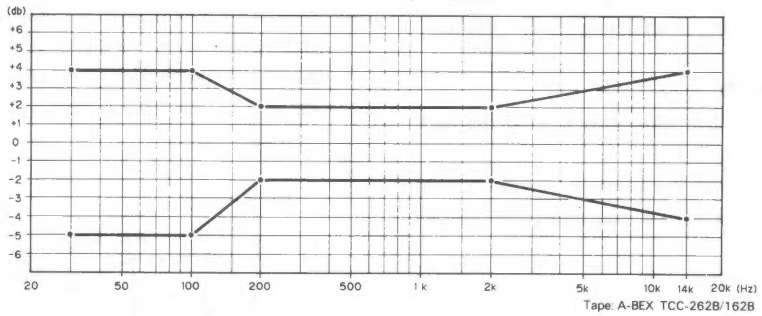




4. Adjusting the Playback and Recording Section

Procedure	Item	Usage tape — input condition	Response	Mode	Adjustment location	Adjustment procedure
1	PLAYBACK GAIN	A-BEX TCC-130	Fig. 4-1	PLAYBACK	A: RT-101 (L) RT-201 (R) B: RT-102 (L) RT-202 (R)	Adjust the LINEOUT output to 775 mV (0 dBs).
2	P.B. Frequency	A-BEX TCC-162B, 262B	Fig. 4-1	PLAYBACK		Make sure the playback characteristics conform to Figure 4-2.
3	REC/P.B. Frequency	HD7E/60 1 kHz, —40 dB 10 kHz, —40 dB	Fig. 4-2	REC. PLAY ↓ PLAYBACK	A: RT-401 (L) RT-402 (R) B: RT-403 (L) RT-404 (R)	Record 1 kHz and 10 kHz alternately. Adjust each volume so the 10 kHz playback output is 0.5 dB in relation to the 1 kHz playback output.
4	REC GAIN	HD7E/60 1 kHz, —30 dB	Fig. 4-2	REC. PLAY ↓ PLAYBACK	A: RT-140 (L) RT-240 (R) B: RT-150 (L) RT-250 (R)	Adjust each volume to the playback output is the same as when the recording monitor is output.
5	REC/P.B. Frequency	HD7E/60 Dolby NR C	Fig. 4-3	REC. PLAY ↓ PLAYBACK		Make sure that the DOLBY NR C recording and playback characteristics conform to Figure 4-3.

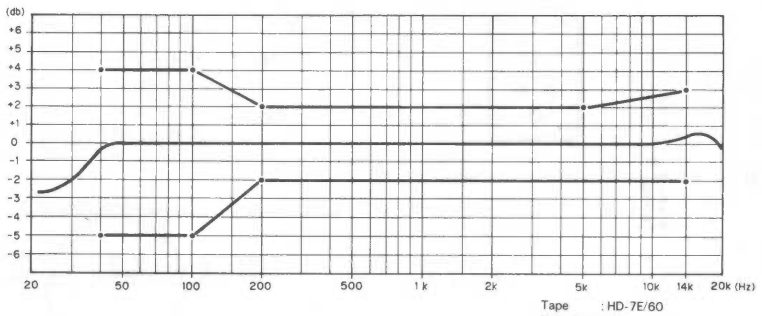
Playback Frequency Response



Tape: A-BEX TCC-262B/162B

Fig. 4-1

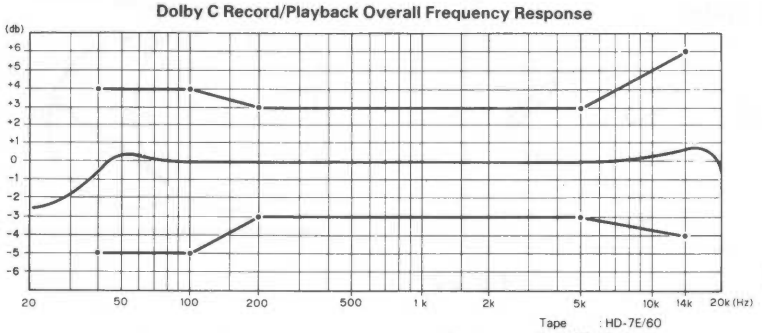
Record/Playback Overall Frequency Response



Tape : HD-7E/60
Dolby NR : Off
Level : —20 dB From Dolby Level

Fig. 4-2

Dolby C Record/Playback Overall Frequency Response



Tape : HD-7E/60
Dolby NR : On C
Level : —20 dB From Dolby Level

Fig. 4-3

PARTS LIST OF 1U-2238/2239 AUDIO/METER UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTOR GROUP			
IC301	263 0590 001	IC UPC1330HA	
IC302	263 0317 006	IC M5220P	
IC303	263 0720 004	IC HA12170NT	
IC304	263 0563 007	IC BA15218	
IC306	263 0711 000	IC M5218AP	
IC307	263 0354 001	IC UPC1297CA	
IC308	263 0563 007	IC BA15218	
IC501	262 1469 002	IC UPD75004CU-***	
IC502	262 0447 009	IC BA6109U1	
IC601	263 0363 005	IC AN6882	
IC701	263 0363 005	IC AN6882	
TR101	269 0074 907	Digital Tr. DTC114TS(10K)T	
TR103	273 0245 900	Transistor 2SC2603E/F T	
TR104	275 0048 909	Transistor 2SK381(D)/(E)-T	
TR105 ~108	269 0074 907	Digital Tr. DTC114TS(10K)T	
TR201	269 0074 907	Digital Tr. DTC114TS(10K)T	
TR203	273 0245 900	Transistor 2SC2603E/F T	
TR204	275 0048 909	Transistor 2SK381(D)/(E)-T	
TR205 ~208	269 0074 907	Digital Tr. DTC114TS(10K)T	
TR301	269 0016 907	Digital Tr. DTA144WS(47K-22K)T	
TR302	269 0062 906	Digital Tr. DTC124ES(22K-22K)T	
TR307	269 0040 902	Digital Tr. DTC144ES(47K-47K)T	
TR308	272 0025 907	Transistor 2SB562(C)TF	
TR309	273 0245 900	Transistor 2SC2603E/F T	
TR310	273 0245 900	Transistor 2SC2603E/F T	
TR311	269 0015 908	Digital Tr. DTC124XS(22K-47K)T	
TR312	269 0015 908	Digital Tr. DTC124XS(22K-47K)T	
TR501	269 0062 906	Digital Tr. DTC124ES(22K-22K)T	
TR502	274 0036 905	Transistor 2SD468(C)TF	
TR503	269 0015 908	Digital Tr. DTC124XS(22K-47K)T	
TR504	274 0036 905	Transistor 2SD468(C)TF	
TR506	269 0099 908	Digital Tr. DTC143TS(4.7K)T	
TR508	271 0183 927	Transistor 2SA933(R/S)T-93	
TR511	269 0022 904	Digital Tr. DTA143ES(4.7K-4.7K)T	
TR512	269 0018 905	Digital Tr. DTC143ES(4.7K-4.7K)T	
TR513	269 0022 904	Digital Tr. DTA143ES(4.7K-4.7K)T	
TR514	269 0018 905	Digital Tr. DTC143ES(4.7K-4.7K)T	
TR901	263 0656 000	Transistor MC7808	
TR902	263 0657 009	Transistor MC7908	
TR903	274 0036 905	Transistor 2SD468(C)TF	
TR904	273 0178 925	Transistor 2SC1740(R/S)T-70	
TR905	263 0651 005	Transistor MC7812CT	
TR906	271 0183 927	Transistor 2SA933(R/S)T-93	

Ref. No.	Part No.	Part Name	Remarks
D301	276 0432 903	Diode 1SS270ATE	
D302	276 0432 903	Diode 1SS270ATE	
D303	276 0432 903	Diode 1SS270ATE	
D304	276 0432 903	Diode 1SS270ATE	
D321	276 0468 919	Zener Diode HZS9B-2TD	
D322	276 0468 919	Zener Diode HZS9B-2TD	
D401 ~411	276 0432 903	Diode 1SS270ATE	
D501	276 0432 903	Diode 1SS270ATE	
D503 ~506	276 0049 901	Diode 1S2076TE	
D507	276 0465 912	Zener Diode HZS7B-2TD	
D508	276 0460 920	Zener Diode HZS5C-3TD	
D509	276 0049 901	Diode 1S2076TE	
D510	276 0468 919	Zener Diode HZS9B-2TD	
D511	276 0468 919	Zener Diode HZS9B-2TD	
D512 ~516	276 0432 903	Diode 1SS270ATE	
D901 ~906	276 0519 907	Diode 1SR35-200AT82	
D907	276 0049 901	Diode 1S2076TE	
D908	276 0049 901	Diode 1S2076TE	
D909	276 0519 907	Diode 1SR35-200AT82	
D910	276 0519 907	Diode 1SR35-200AT82	
D911	276 0463 927	Zener Diode HZS6C-3TD	
D913	276 0456 918	Zener Diode HZS4B-2TD	
LE602 ~605	393 9424 903	Light E.Diode LN39GPX-TA	GREEN
LE606 ~608	393 9423 904	Light E.Diode LN29RPX-TA	RED
LE702 ~705	393 9424 903	Light E.Diode LN39GPX-TA	GREEN
LE706 ~708	393 9423 904	Light E.Diode LN29RPX-TA	RED
LE801 ~804	393 9425 902	Light E.Diode LN49YPX-TA	ORANGE
LE805	393 9423 904	Light E.Diode LN29RPX-TA	RED
LE806	393 9425 902	Light E.Diode LN49YPX-TA	ORANGE
RESISTOR GROUP			
VR301	211 0571 003	Valiable 250K ohm	V11V25FZ254K (BAL.)
VR302	211 0570 004	Valiable 100K ohm	V14V25FA104R (INPUT)
VR303	211 0608 002	Valiable 1K ohm	V11V25FB102K (BIAS)
RT101	211 6077 954	Adjust 22K ohm	V06PB223 (REC GAIN)
RT102	211 6077 954	Adjust 22K ohm	V06PB223 (PB GAIN)
RT103	211 6077 983	Adjust 47K ohm	V06PB473 (BIAS)
RT201	211 6077 954	Adjust 22K ohm	V06PB223 (REC GAIN)
RT202	211 6077 954	Adjust 22K ohm	V06PB223 (PB GAIN)
RT203	211 6077 983	Adjust 47K ohm	V06PB473 (BIAS)
CAPACITOR GROUP			
C101	253 1179 990	Ceramic 560p/50V	CK45B1H561KT
C102	254 4250 916	Electrolytic 47 μ/6.3V	CE04W0J470MT
C103	255 1209 905	Film 0.0056 μ/50V	CQ93M1H562JT
C106	255 1214 903	Film 0.015 μ/50V	CQ93M1H153JT
C107	254 3056 920	Electrolytic 2.2 μ/50V(BP)	CE04D1H2R2MBPT

Ref. No.	Part No.	Part Name	Remarks
C108	254 3056 920	Electrolytic 2.2 μ/50V(BP)	CE04D1H2R2MBPT
C121	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C122	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C123	253 9030 950	Ceramic 0.0068 μ/25V	CK45=1E682KT
C124	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C125	253 9031 917	Ceramic 0.068 μ/25V	CK45=1E683KT
C126	255 1208 906	Film 0.0047 μ/50V	CQ93M1H472JT
C127	253 1179 929	Ceramic 150p/50V	CK45B1H151KT
C128	253 1180 947	Ceramic 0.0015 μ/50V	CK45B1H152KT
C129	253 9031 975	Ceramic 0.0039 μ/25V	CK45=1E392KT
C130	253 1180 947	Ceramic 0.0015 μ/50V	CK45B1H152KT
C131	253 9030 934	Ceramic 0.0033 μ/25V	CK45=1E332KT
C132	253 9031 962	Ceramic 0.0027 μ/25V	CK45=1E272KT
C133	253 9031 975	Ceramic 0.0039 μ/25V	CK45=1E392KT
C134	254 4252 927	Electrolytic 47 μ/10V	CE04W1A470MT
C135 ~137	255 1204 900	Film 0.0022 μ/50V	CQ93M1H222JT
C138	254 4260 906	Electrolytic 0.1 μ/50V	CE04W1H0R1MT
C139	254 4260 906	Electrolytic 0.1 μ/50V	CE04W1H0R1MT
C140	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C142	253 1179 945	Ceramic 220p/50V	CK45B1H221KT
C171	253 1131 909	Ceramic 390p/500V	CK45B2H391KT
C172	253 1179 903	Ceramic 100p/50V	CK45B1H101KT
C173	253 9030 963	Ceramic 0.01 μ/25V	CK45=1E103KT
C174	253 1180 918	Ceramic 820p/50V	CK45B1H821KT
C175	253 9030 989	Ceramic 0.022 μ/25V	CK45=1E223KT
C176	253 9030 992	Ceramic 0.033 μ/25V	CK45=1E333KT
C201	253 1179 990	Ceramic 560p/50V	CK45B1H561KT
C202	254 4250 916	Electrolytic 47 μ/6.3V	CE04W0J470MT
C203	255 1209 905	Film 0.0056 μ/50V	CQ93M1H562JT
C206	255 1214 903	Film 0.015 μ/50V	CQ93M1H153JT
C207	254 3056 920	Electrolytic 2.2 μ/50V(BP)	CE04D1H2R2MBPT
C208	254 3056 920	Electrolytic 2.2 μ/50V(BP)	CE04D1H2R2MBPT
C221	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C222	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C223	253 9030 950	Ceramic 0.0068 μ/25V	CK45=1E682KT
C224	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C225	253 9031 917	Ceramic 0.068 μ/25V	CK45=1E683KT
C226	255 1208 906	Film 0.0047 μ/50V	CQ93M1H472JT
C227	253 1179 929	Ceramic 150p/50V	CK45B1H151KT
C228	253 1180 947	Ceramic 0.0015 μ/50V	CK45B1H152KT
C229	253 9031 975	Ceramic 0.0039 μ/25V	CK45=1E392KT
C230	253 1180 947	Ceramic 0.0015 μ/50V	CK45B1H152KT
C231	253 9030 934	Ceramic 0.0033 μ/25V	CK45=1E332KT
C232	253 9031 962	Ceramic 0.0027 μ/25V	CK45=1E272KT
C233	253 9031 975	Ceramic 0.0039 μ/25V	CK45=1E392KT
C234	254 4252 927	Electrolytic 47 μ/10V	CK04W1A470MT
C235 ~237	255 1204 900	Film 0.0022 μ/50V	CQ93M1H222JT
C238	254 4260 906	Electrolytic 0.1 μ/50V	CE04W1H0R1MT
C239	254 4260 906	Electrolytic 0.1 μ/50V	CE04W1H0R1MT
C240	254 4258 905	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C242	253 1179 945	Ceramic 220p/50V	CK45B1H221KT
C271	253 1131 909	Ceramic 390p/500V	CK45B2H391KT
C272	253 1179 903	Ceramic 100p/50V	CK45B1H101KT
C273	253 9030 963	Ceramic 0.01 μ/25V	CK45=1E103KT
C274	253 1180 918	Ceramic 820p/50V	CK45B1H821KT
C275	253 9030 989	Ceramic 0.022 μ/25V	CK45=1E223KT
C276	253 9030 992	Ceramic 0.033 μ/25V	CK45=1E333KT
C302	254 4252 927	Electrolytic 47 μ/10V	CE04W1A470MT
C303	254 4252 927	Electrolytic 47 μ/10V	CE04W1A470MT
C305	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C306	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT

Ref. No.	Part No.	Part Name	Remarks
C307	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C308	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C309	253 1179 945	Ceramic 220p/50V	CK45B1H221KT
C310	254 4252 901	Electrolytic 22 μ/10V	CE04W1A220MT
C311	253 9030 934	Ceramic 0.0033 μ/25V	CK45=1E332KT
C312	254 4256 907	Electrolytic 10 μ/25V	CE04W1E100MT
C313	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C314	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C315	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C316	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C317	254 4256 949	Electrolytic 100 μ/25V	CE04W1E101MT
C318	253 9030 950	Ceramic 0.0068 μ/25V	CK45=1E682KT
C320	253 9030 963	Ceramic 0.01 μ/25V	CK45=1E103KT
C322	253 9030 921	Ceramic 0.0022 μ/25V	CK45=1E222KT
C323	253 9030 921	Ceramic 0.0022 μ/25V	CK45=1E222KT
C324	255 4120 900	Film 0.0068 μ/100V	CQ93P2A682JT
C325	253 9031 904	Ceramic 0.047 μ/25V	CK45=1E473KT
C326	253 4412 900	Ceramic 10p/50V	CC45SL1H100DT
C327	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C328	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C329	254 4260 906	Electrolytic 0.1 μ/50V	CE04W1H0R1MT
C330	254 4260 935	Electrolytic 0.47 μ/50V	CE04W1HR47MT
C501	254 4250 767	Electrolytic 1000 μ/6.3V	CE04W0J102MC
C503	253 9030 921	Ceramic 0.0022 μ/25V	CK45=1E222KT
C504	253 9031 917	Ceramic 0.068 μ/25V	CK45=1E683KT
C505 ~508	253 1180 921	Ceramic 0.001 μ/50V	CK45B1H102KT
C509	253 9030 963	Ceramic 0.01 μ/25V	CK45=1E103KT
C510	253 9030 989	Ceramic 0.022 μ/25V	CK45=1E223KT
C601	254 4195 916	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C701	254 4195 916	Electrolytic 4.7 μ/35V	CE04W1V4R7MT
C801	254 4193 921	Electrolytic 33 μ/16V	CE04W1C330MT
C901	254 4256 787	Electrolytic 1000 μ/25V	CE04W1E102MC
C902	254 4256 787	Electrolytic 1000 μ/25V	CE04W1E102MC
C905	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C906	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C907	254 4256 790	Electrolytic 2200 μ/25V	CE04W1E222MC
C908	254 4254 941	Electrolytic 100 μ/16V	CE04W1C101MT
C909	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
C910	254 4252 927	Electrolytic 47 μ/10V	CE04W1A470MT
C911	254 4254 909	Electrolytic 10 μ/16V	CE04W1C100MT
OTHER PARTS			
L101	232 0157 000	MPX FILTER	
L102	239 0010 009	HX STEP UP COIL	
L103	235 0020 945	INDUCTOR 153JT	
L104	235 0020 916	INDUCTOR 822JT	
L201	232 0157 000	MPX FILTER	
L202	239 0010 009	HX STEP UP COIL	
L203	235 0020 945	INDUCTOR 153JT	
L204	235 0020 916	INDUCTOR 822JT	
L301	231 0078 005	OSC COIL	
XT501	399 0107 007	CST 4.19MGW	CLOCK
SW401 ~411	212 4388 907	TACT SWITCH	
JK301	204 8261 003	4P PIN JACK	
JK302	204 8264 026	HEAD PHONE JACK	
JK303	204 8260 004	MINI JACK	
CN121	205 0406 050	5P CONNECTOR BASE (KR-PH)	INPUT VR
CN131	205 0343 045	4P CONNECTOR BASE (KR-PH)	METER
CN132	205 0343 074	7P CONNECTOR BASE (KR-PH)	KEY
CN191	205 0233 058	5P EH CONNECTOR BASE	R/P HEAD

Ref. No.	Part No.	Part Name	Remarks
CN301	205 0233 058	5P EH CONNECTOR BASE	POWER
CN302	205 0233 032	3P EH CONNECTOR BASE	ERASED HEAD
W121	203 8241 020	5P KR-DA CONNECTOR CORD	INPUT VR
W131	203 6260 003	4P KR-DA CONNECTOR CORD	METER
W132	204 2326 012	7P KR-DA CONNECTOR CORD	KEY
W151	203 8241 004	5P KR-DA CONNECTOR CORD	PACK SW
W152	203 8241 017	5P KR-DA CONNECTOR CORD	DRIVE
W153	203 4580 002	3P KR-DA CONNECTOR CORD	REEL

PARTS LIST OF 4U-1943 POWER SUPPLY UNIT

Ref. No.	Part No.	Part Name	Remarks
C001 ⚠	253 8010 007	Ceramic Capacitor 0.01 μ/400VAC	CK45=2GAC103P
SW001 ⚠	212 0286 003	POWER SWITCH	
⚠	233 5773 000	POWER TRANSFORMER	Europe U.K. Australia
⚠	233 5774 009	POWER TRANSFORMER	U.S.A. Canada
⚠	233 5776 007	POWER TRANSFORMER	Asia
⚠	206 2063 009	AC CORD WITH PLUG	Europe
⚠	206 2024 006	AC CORD WITH LABEL	U.K.
⚠	206 2084 004	AC CORD	Australia
⚠	206 2061 001	AC CORD	U.S.A. Canada
⚠	200 6031 026	AC CORD	Asia
⚠	212 4698 008	VOLTAGE SELECTOR	Asia only
W191	203 8258 013	5P EH-SCN CONNECTOR CORD	

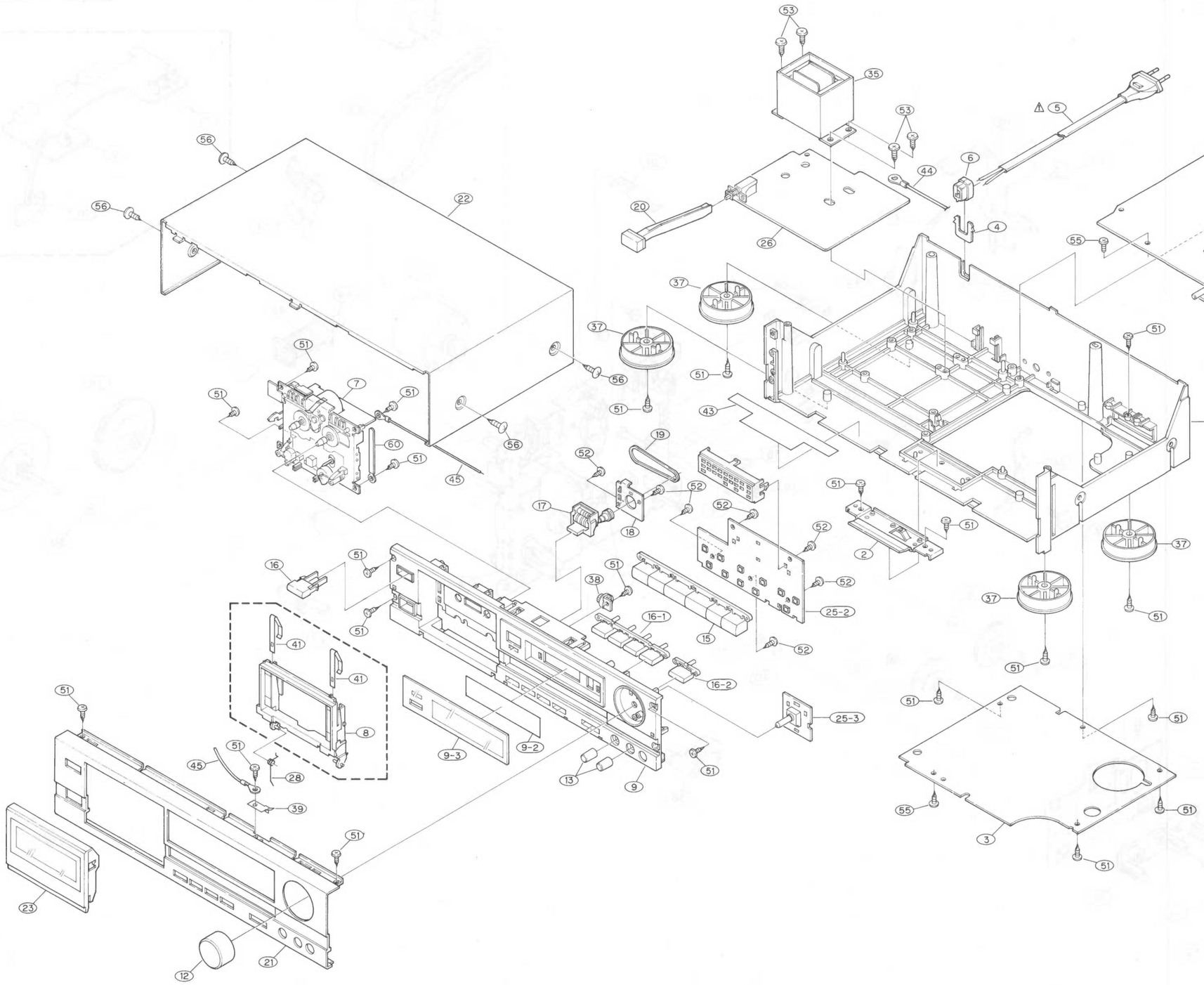
PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
⊙ 1	411 1000 458	CHASSIS	Europe U.K. Australia
⊙	411 1000 487	CHASSIS	U.S.A. Canada
⊙	411 1000 461	CHASSIS	Multi. Voltage (Asia)
⊙	411 1000 474	CHASSIS	(Gold)
⊙ 2	412 2523 102	EARTH BRAKET	
⊙ 3	105 0787 000	BOTTOM COVER	
⊙ 4	412 2008 012	BUSHING PLATE	
⚠ 5	206 2063 009	AC CORD WITH PLUG	Europe
⚠	206 2061 001	AC CORD	U.S.A. Canada
⚠	206 2024 006	AC CORD WITH LABEL	U.K.
⚠	206 2084 004	AC CORD	Australia
⚠	200 6031 026	AC CORD	Multi. Voltage (Asia)
⚠ 6	445 0056 000	CORD BUSH	
7	338 0140 001	CASSETTE MECHA (CMAY5Z)	
8	103 1372 308	CASSETTE BOX	
	103 1372 311	CASSETTE BOX	U.S.A. Only
9	103 1454 103	FRONT ESC. ASS'Y	Europe U.K. Australia Multi. Voltage (Asia)
	103 1454 116	FRONT ESC. ASS'Y	U.S.A. Canada
	103 1454 129	FRONT ESC. ASS'Y	(Gold)
⊙ 9-2	129 0181 000	COLOR FILTER	
⊙ 9-3	143 0731 003	METER WINDOW	
12	112 0515 131	VOLUME KNOB	
	112 0515 128	VOLUME KNOB	U.S.A. Only
	112 0515 144	VOLUME KNOB	(Gold)
13	112 0644 002	VOLUME KNOB (C)	
	112 0644 015	VOLUME KNOB (C)	(Gold)
15	113 1436 209	FUNCTION KEY	
	113 1436 212	FUNCTION KEY	U.S.A. Only
	113 1436 225	FUNCTION KEY	(Gold)
16	113 1438 003	EJECT KNOB ASS'Y	
	113 1438 016	EJECT KNOB ASS'Y	U.S.A. Only
	113 1438 029	EJECT KNOB ASS'Y	(Gold)
16-1	113 1437 004	PUSH KNOB (A)	
	113 1437 017	PUSH KNOB (A)	U.S.A. Only
	113 1437 020	PUSH KNOB (A)	(Gold)
16-2	113 1452 005	PUSH KNOB (B)	
	113 1452 018	PUSH KNOB (B)	U.S.A. Only
	113 1452 021	PUSH KNOB (B)	(Gold)
17	459 0008 000	COUNTER	
⊙ 18	412 3352 000	COUNTER BRACKET	
19	423 0033 034	COUNTER BELT	
20	431 0310 004	P. SW LEVER ASS'Y	
	431 0310 017	P. SW LEVER ASS'Y	U.S.A. Only
	431 0310 020	P. SW LEVER ASS'Y	(Gold)
21	144 2116 001	FRONT PANEL	
	144 2116 014	FRONT PANEL	(Gold)
⊙ 22	102 0434 309	TOP COVER	
⊙	102 0434 312	TOP COVER	(Gold)
23	103 1451 232	CASSETTE WINDOW (A) ASS'Y	
	103 1451 245	CASSETTE WINDOW (A) ASS'Y	U.S.A. Only
	103 1451 258	CASSETTE WINDOW (A) ASS'Y	(Gold)

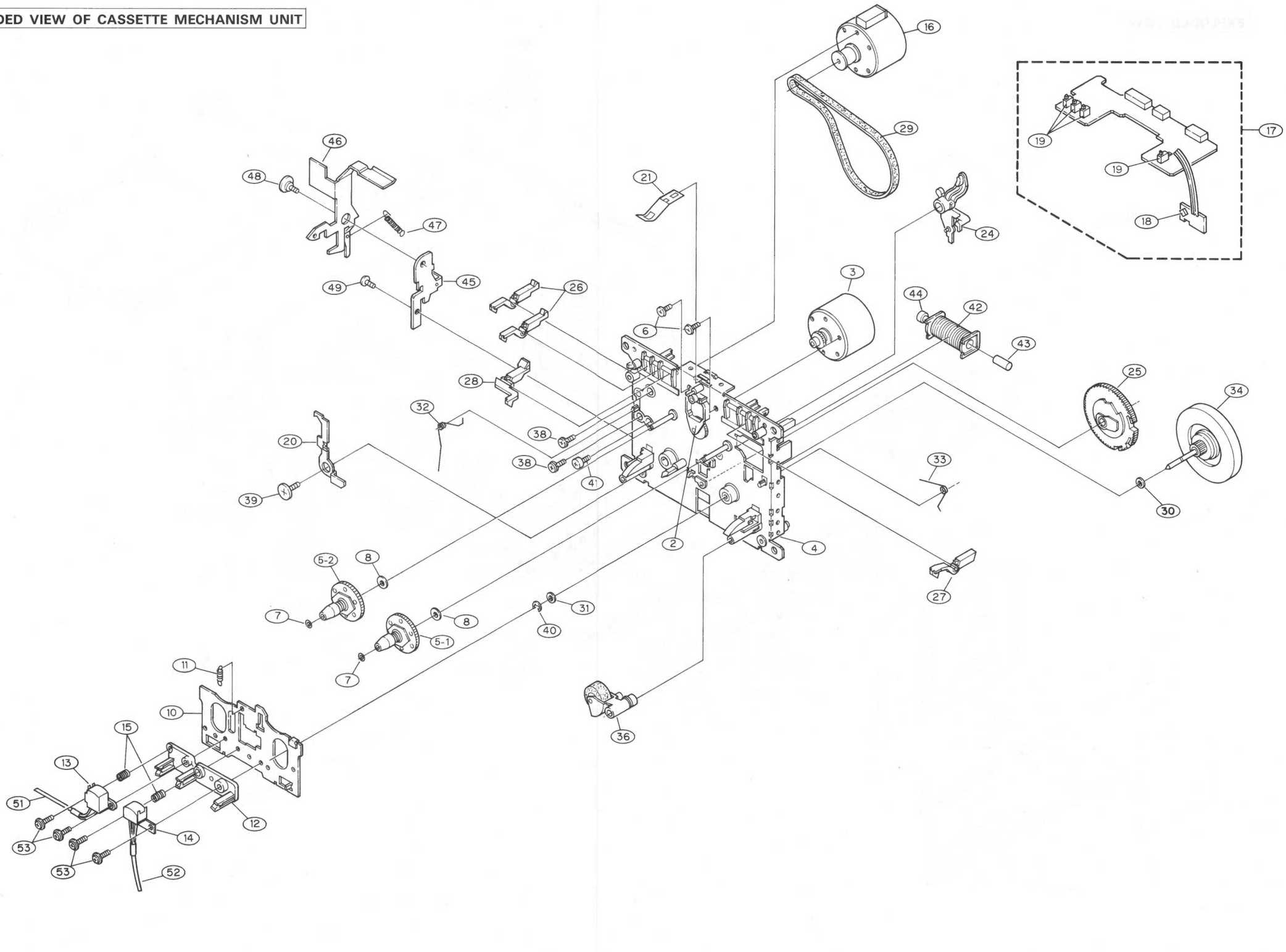
Ref. No.	Part No.	Part Name	Remarks
⊙ 25	1U- 2238	AUDIO/METER P.W.B. UNIT	
25-1		AUDIO P.W.B. UNIT	
25-2		METER P.W.B. UNIT	
25-3		METER P.W.B. UNIT	
⊙ 26	4U- 1943 Z	P. SUPPLY P.W.B. UNIT	Europe
⊙	4U- 1943 U	P. SUPPLY P.W.B. UNIT	U.S.A. Canada
⊙	4U- 1943 K	P. SUPPLY P.W.B. UNIT	U.K. Australia
⊙	4U- 1943 M	P. SUPPLY P.W.B. UNIT	Multi. Voltage (Asia)
28	463 0659 018	BOX SPRING	
⚠ 35	233 5773 000	POWER TRANSFORMER	Europe U.K. Australia
⚠	233 5774 009	POWER TRANSFORMER	U.S.A. Canada
⚠	233 5776 007	POWER TRANSFORMER	Multi. Voltage (Asia)
37	104 0208 007	FOOT ASS'Y	
38	421 9007 007	MINI DAMPER	
⊙ 39	414 0595 002	EARTH PLATE	
40	441 1036 009	LED HOLDER	
41	463 0655 009	CASSETTE SPRING	
⊙ 43	414 0596 001	SHIELD LABEL	
44	203 0453 010	1P CONTACT ASS'Y	
45	203 0230 026	1P CONNECTOR	
51	473 7508 017	3×10 CBTS (P)-B	
52	473 7500 044	3×8 CBTS (P)-B	
53	473 7502 013	4×10 CBTS (P)-Z	
55	473 7002 018	3×8 CBTS (S)-Z	
56	473 7503 038	4×10 CTTS (P) BK	
	473 7503 041	4×10 CTTS (P) NI	(Gold)
⊙ 60	445 8028 009	CORD HOLDER	

- Parts marked with ⚠ and/or shading have special characteristics important to safety.
  Be sure to use the specified parts for replacement.
- Part indicated with the mark "⊙" are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- (Gold) in the Remarks column refers with gold front panels.

EXPLODED VIEW



EXPLODED VIEW OF CASSETTE MECHANISM UNIT



PARTS LIST OF CASSETTE MECHANISM EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
⊙ 2	9DF 5170 49	IDLER BLK	
3	9DF 5642 80	MTR REEL BLK	
4	9DF 6121 51	CHASSIS BASE BLK	
5-1	9DF 6230 37	REEL BASE BLK	
5-2	9DF 6231 27	REEL BASE BLK	
6	9DF G156 11A	SCREW 2.6 ×6.4 ZN	
7	9DF J111 17	WASHER 1.7 ×0.25	
8	9DU J12V 11	POLY WASHER 2.1 ×0.25T	
10	9DF C52E 46	HEAD BASE	
11	9DF K26N 14	HB SPRING	
12	9DF D45T 16	HEAD SPACER	
13	9DF U192 11	ERASE HEAD	
14	9DF U17A 11A	R/P HEAD	
15	9DF K21U 11	SPRING	
16	9DF 5252 69	MTR MAIN BLK	
⊙ 17	9DF 5673 07	PCB CONTROI BLK	
18	9DA W13F 00	GP2S04B	
19	9DU E16E 11	PUSH SWITCH	
20	9DF C39L 70	EJECT PROTECT ARM	
21	9DF C52H 12	CASSETTE SPRING	
24	9DF D45G 13	PLAY ARM	
25	9DF D45B 15	CAM GEAR (3R)	
26	9DF D44T 14	REC. SENSOR LEVER	
27	9DF D44Y 12	PACK SENSOR LEVER	
29	9DF F17W 21	MAIN BELT	
30	9DF J111 30	POLY WASHER 2.6 ×0.25	
31	9DF J111 14	POLY WASHER 2.6 ×0.5	
32	9DF K28M 15	EJECT PROTECT SPRING	
33	9DF K28R 11	SLIDE SPRING	
34	9DF R22H 11	FLYWHEEL ASS'Y (FWD)	
36	9DF R20L 21A	PINCH ROLLER ASS'Y (R)	
38	9DF G114 14	SCREW 2.6 ×5 ZN	
39	9DU G15S 11A	SCREW WITH STEP (7.7)	
40	9DU G13U 15	E RING	
41	9DU G20B 11	WEVE SCREW 3.0 ×8 ZN	
42	9DF 7652 63	SOLENOID BLK	
43	9DF L39H 12A	IRON CORE	
44	9DF L39K 12	PLUNGER	
⊙ 45	9DF C33L 51	DUMPER BKT	
⊙ 46	9DF C52P B1	EJECT ARM	
47	9DF K29H 11	EJECT ARM SPRING	
48	9DU G14M 21	SCREW WITH STEP (4.7)	
49	9DK G194 28	SCREW 2.6 ×4 ZN	
51	9DW H51V 05	E. HEAD CORD	
52	9DW H51U 05	R/P HEAD CORD	
53	9DF G137 18	2 ×9F LOCK SCREW	

NOTE FOR PARTS LIST

- Part indicated with the mark "⊙" are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicated "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.
- Not including Carbon Film ±5%, 1/6 W, 1/4 W Type in the P. W. Board parts list.
- Parts marked with this symbol ⚠ ▒▒ have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

- Refer to the following table for the codes of the resistors and capacitors appearing on the parts list.

• Resistors

Ex.: RN 14K 2E 182 G FR

Type	Shape and performance	Power	Resistance ★	Allowable error	Others
RD : Carbon RC : Fixed RS : Metallic film RW : Winding RN : Metal film RK : Metal mixture		2B : 1/8W 2E : 1/4W 2H : 1/2W 3A : 1W 3D : 2W 3F : 3W 3H : 5W	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20%		P : Pulse-resistant type NL : Low noise type NB : Non-burning type FR : Fuse resistor F : Lead wire forming

★ Resistance

1 8 2 ⇨ 1800Ω = 1.8kΩ
- 2-digit effective number, decimal point indicated by R.
- Indicates number of zeros after effective number
- Units: Ω

• Capacitors

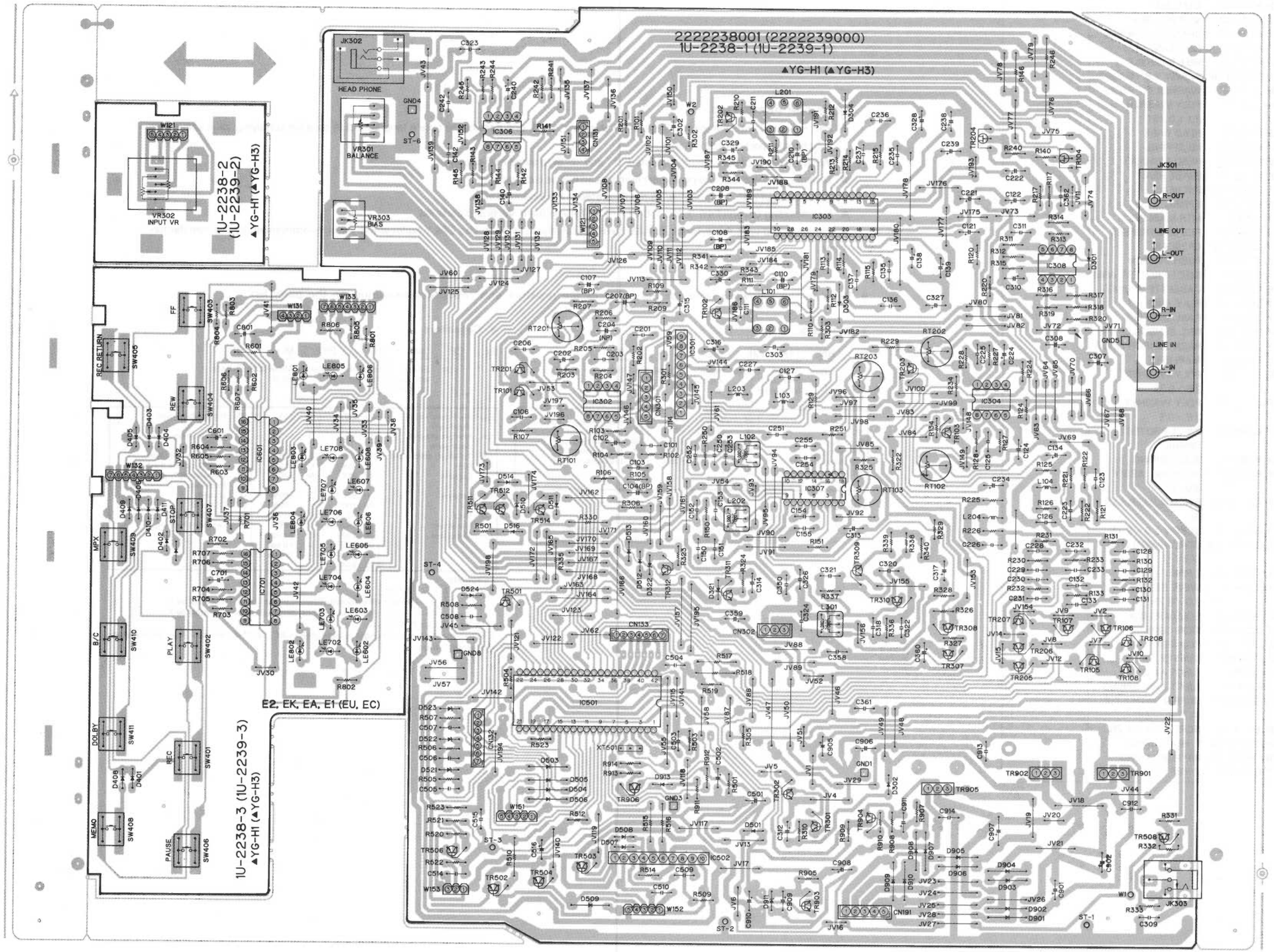
Ex.: CE 04W 1H 2R2 M BP

Type	Shape and performance	Dielectric strength	Capacity ★	Allowable error	Others
CE : Aluminum foil electrolyte CA : Aluminum solid electrolyte CS : Tantalum electrolyte CQ : Film CK : Ceramic CC : Ceramic CP : Oil CM : Mica CF : Metallized CH : Metallized		0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 2A : 100V 2B : 125V 2C : 160V 2D : 200V 2E : 250V 2H : 500V 2J : 630V	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20% Z : +80% −20% P : +100% −0% C : ±0.25pF D : ±0.5pF = : Others		HS : High stability type BP : Non-polar type HR : Ripple-resistant type DL : For charge and discharge HF : For assuring high frequency U : UL part C : CSA part W : UL-CSA type F : Lead wire forming

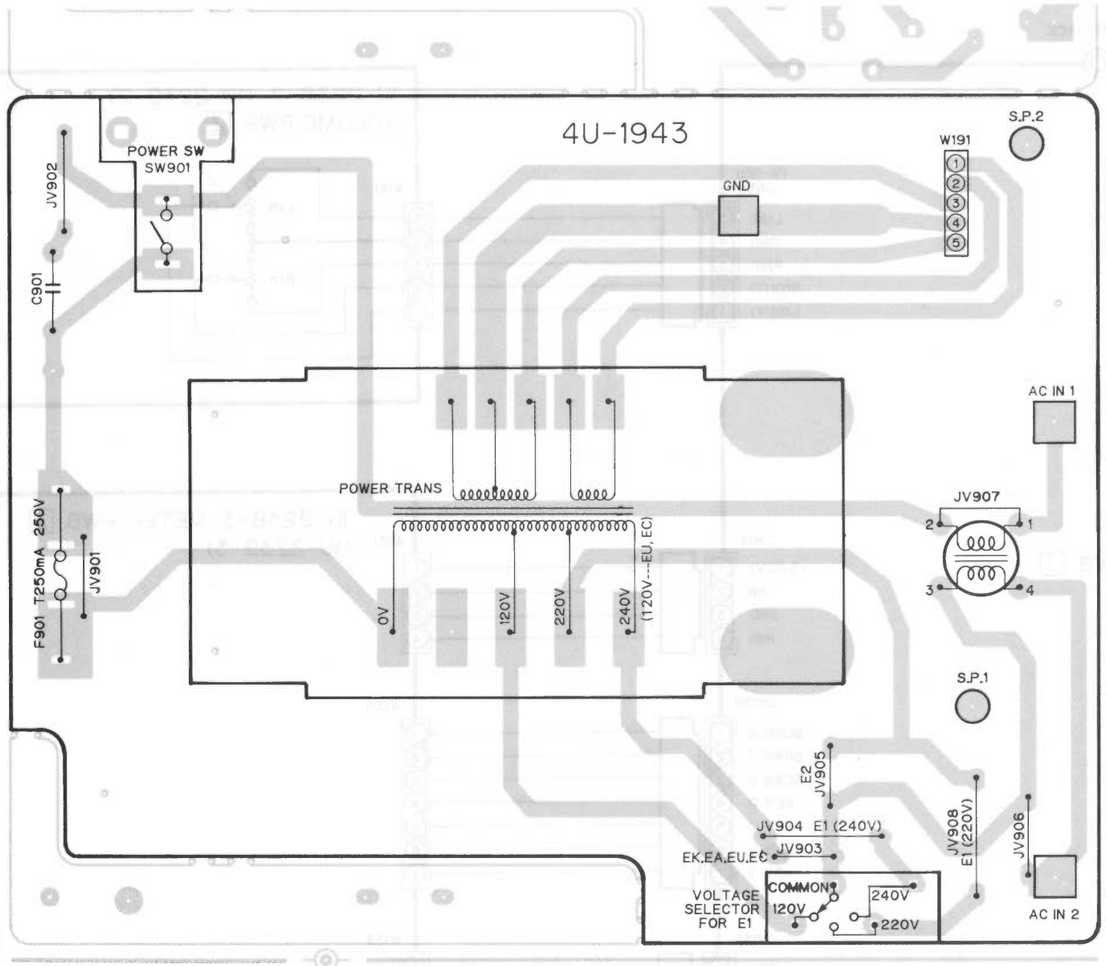
★ Capacity

2 R 2 ⇨ 2.2μF
- 1-digit effective number, decimal point indicated by R.
- 2-digit effective number, decimal point indicated by R.
- Units: μF, (for P, pF (μμF)
- When the dielectric strength is indicated in AC, "AC" is included after the dielectric strength value.

P. W. BOARD OF 1U-2238/2239 AUDIO/METER UNIT



P. W. BOARD OF 4U-1758 POWER SUPPLY UNIT

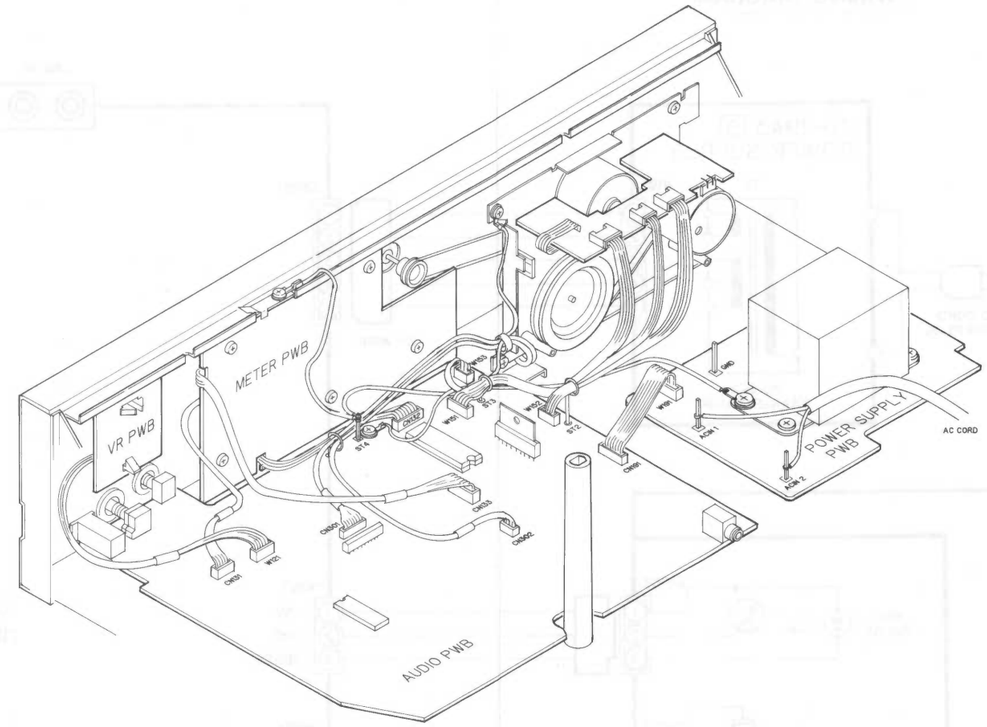


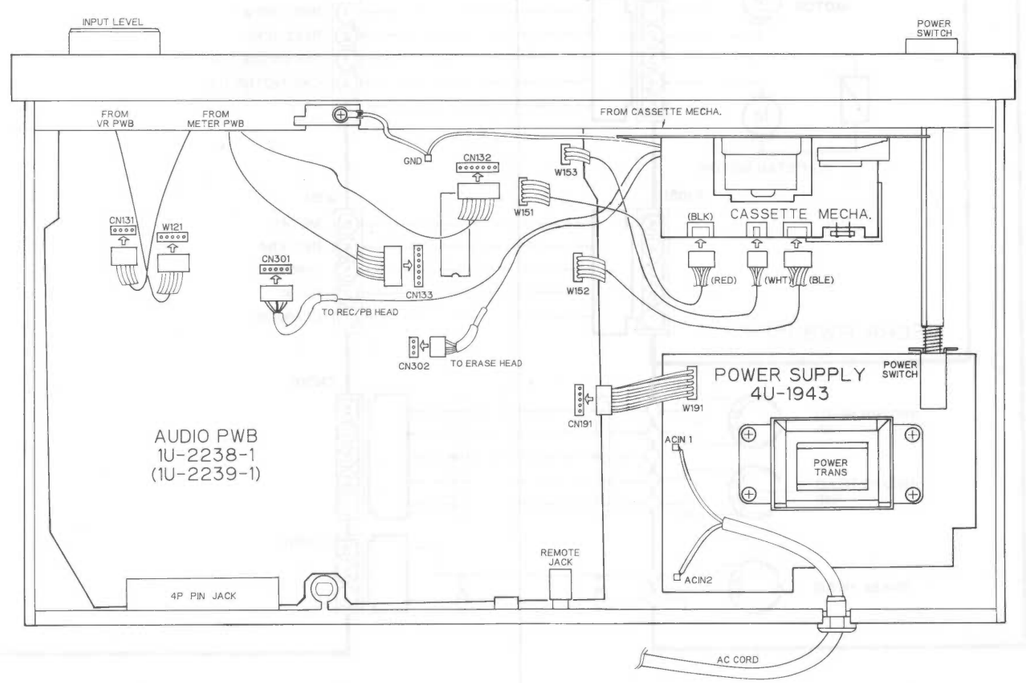
Remarks

1. The following table shows the power circuit parts used for the 4U-1943 board by area.
2. Parts used are marked ○, parts not used —.

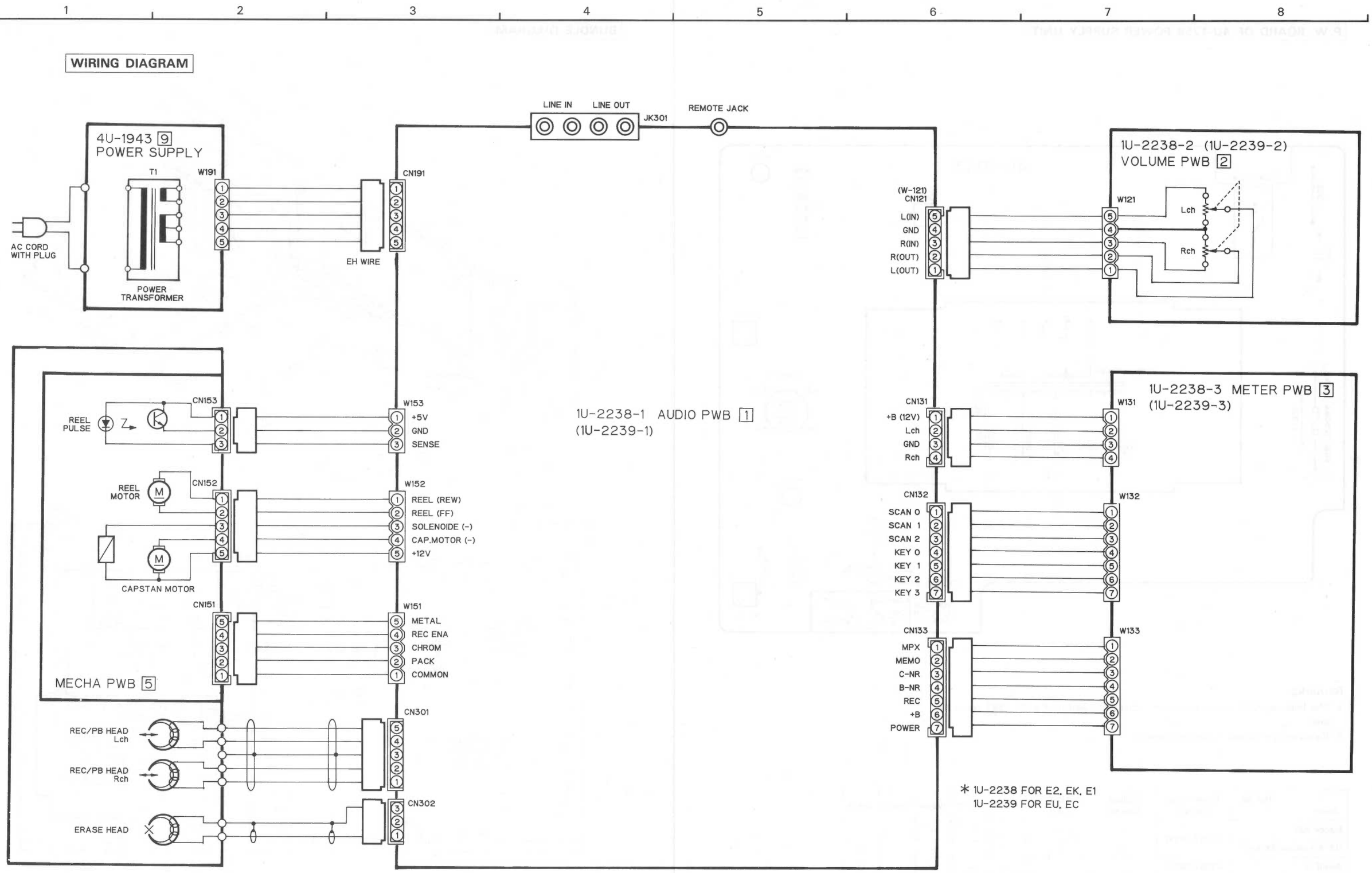
Areas \ Ref. No.	Power Trans Part No.	Voltage Selector	FUSE F901	JV901	JV903	JV904	JV905	JV908
Europe (E2)	2335773000	—	—	○	—	—	○	—
U.K. & Australia (EK, EA)		—	—	○	○	—	—	—
Asia (E1)	2335776007	○	○	—	—	○	—	○
U.S.A. & Canada (EU, EC)	2335774009	—	—	○	○	—	—	—

BUNDLE DIAGRAM

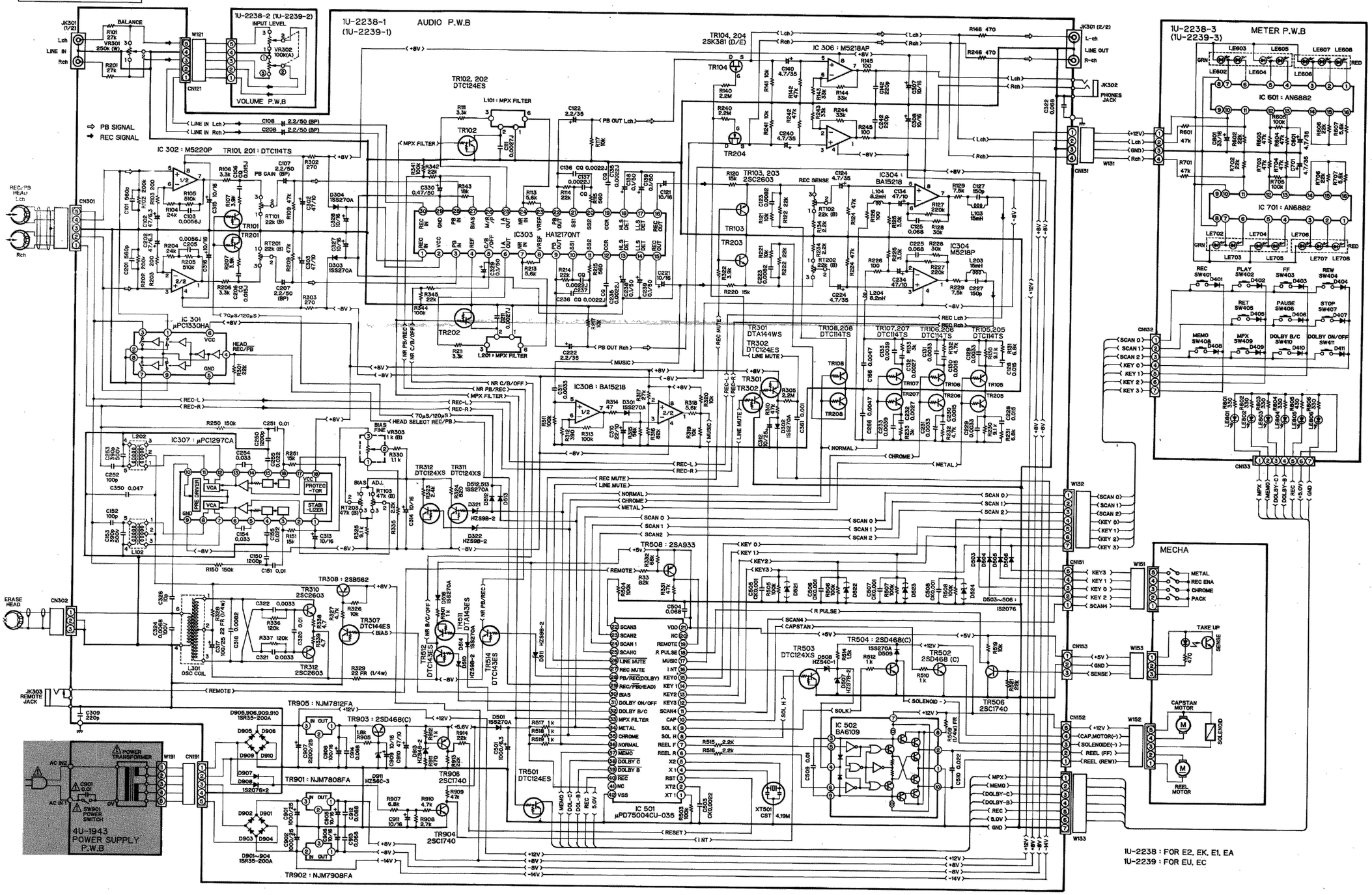




WIRING DIAGRAM



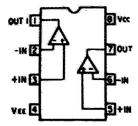
SCHEMATIC DIAGRAM



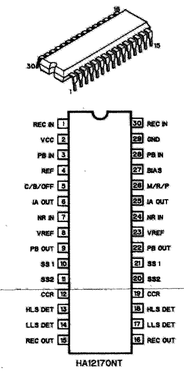
NOTES
ALL RESISTANCE VALUES IN OHM. K = 1,000 OHM, M = 1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P = MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

SEMICONDUCTORS

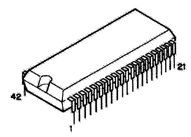
•IC

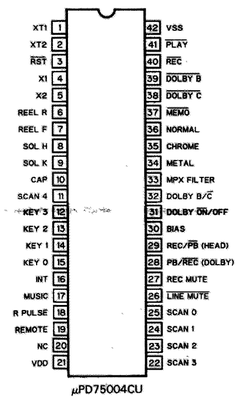


BA15218
M5220P
M5218P

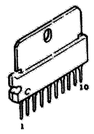


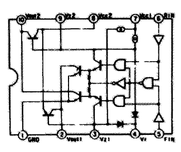
HA12170NT



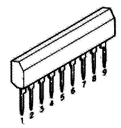


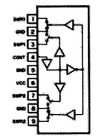
μPD75004CU



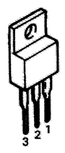


BA6109



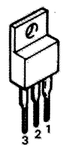


μPC1330HA



MC7908

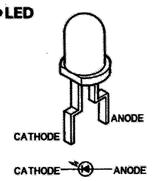
3 GND
2 INPUT
1 OUTPUT



MC7808
MC7812

3 INPUT
2 GND
1 OUTPUT

•LED



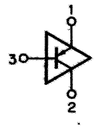
LN39GPX-TA (GREEN)
LN29RPX-TA (RED)
LN49YPX-TA (ORANGE)

•Transistors

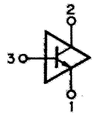
2SK381

2SA933
2SC1740
2SC2603
2SD1111

2SD468
2SB562

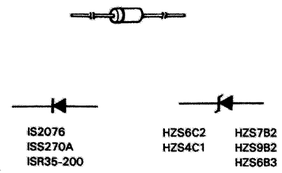


DTA143ES



DTC124XS
DTC144ES
DTC114TS
DTC143ES

•Diodes



IS2076
ISS270A
ISR35-200

HZS6C2
HZS4C1

HZS7B2
HZS9B2
HZS6B3

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